The Influence of Internal and External Factors to the Indian Stock Market

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Abstract. This paper has been undertaken with the aim of testing the applicability of three factor model of Fama and French l (1993) in explaining cross-sectional average return for Stocks in Indian equity market for the time frame of 5 years from 2011-2016. The study has selected sample from the Indian companies stocks traded on NIFTY50 during 2011-16. For the purpose of study, monthly data has been used to assess the performance of various stocks which have been categorized into big and small portfolios. Monthly data gives a better picture as compared to annual data when the time horizon for study is short.

Key words: Internal and external factors, Nifty50, Stocks

1. Introduction

The Capital Asset Pricing Model (CAPM) which was developed by William Sharpe (1964) and John Linter (1965) is a popular technique for calculating the required rate of return of investors, analyzing cost benefits and computing the actual returns of managed portfolios. The CAPM is focused with pricing models in equilibrium conditions and offer significant and intuitively correct and pleasing predictions to measure risk and relation between expected return and risk (Eugene F. Fama; Kenneth R. French, 2004).

The CAPM model states that the portfolio returns are to a great extent influenced by market return. However, market return is not the only factor affecting portfolio returns and has been low potential in determining cross-sectional variations in returns on equity was proved by the empirical study conducted by Fama and French (1992). Fama and French (1996) argue that these deviations that are not explained by the CAPM in average stock returns and can be computed by the three-factor model.

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2. Literature Review

Bhavna Bahl (2006) in a study of 79 stocks listed in the BSE-100 stock market index for India found that factor portfolios that explain the returns are the size factor (SMB) and the market factor which were based on the study of Fama and French three-factor model of stock returns along with its variants .

In 2008, Vanita Tripathi using monthly price data of 455 companies in Indian stock market from the S&P CNX index over the period of June 1997 to June 2007 explained the relationship between four fundamental variable of a company (viz. book equity to market equity ratio, market capitalization, debt equity ratio and price earnings ratio). The results concluded that cross-sectional variations can be explained by the Fama-French three factor model (based on market risk premium, value premium and size premium) in a much better way than the single factor CAPM. The validity of CAPM is lesser in Indian context as compared to other Developing country markets as found out by many researchers.

Golkha, Rao and Malhotra (1998) used CAPM to predict returns in Indian Stock Market. The proxy indices were BSE 500, CRISIL 500 NSE NIFTY for studying risk return relationship. However, they discovered that SML had not provided the expected returns to investors.

Manjunathan and Mustiary (2006) carried out regression analysis on 30 stocks of BSE pertaining to Jan 2000 to Dec 2003.In the study the null hypothesis which stated that the slope of CAPM is equal to difference between market return and risk free rate thus raising apprehensions about its applicability.

3. Hypothesis

Multivariate regression will be applied to test the validity of the Fama French model. The below mentioned hypothesis will be tested

H1: $a \neq 0$

H2: $a1 \neq 0$

H3: $a2 \neq 0$

H4: $a3 \neq 0$

Fama and French three factor model will hold true if and the three slope coefficients a, a1, a2 and a3 are significant i.e. statistically different from 0.

4. Research Methodology

The sample for study comprises of 30 companies which are a part of Nifty50 and are listed on NSE. The actual returns have been calculated on monthly basis. A period of 5 years i.e from Mar 2011- Mar 2016 has been used as data for the study. The data has been collected from National Stock Exchange, although there are a number of stock exchanges in India.

NSE is the fourth largest stock exchange in terms of equity trading volume in 2015 according to World Federation of Exchange. NSE began functioning from 1994 and is the largest stock exchange in India in terms of daily turnover as per SEB reports. NSE was the first stock exchange in India to start derivatives trading (Index Futures) and internet trading in the year 2000.NSE follows an integrated business model, offering services like trading, clearing and settlement, indices, market data feed, financial education technology solutions etc.

5. Calculation of Return on Market Index

- Nifty 50 is taken as the benchmark index.
- Return on nifty 50 is calculated as = (lognormal value of adjusted Closing price of Nifty 50 – log normal value of adjusted Opening price ofNifty50)*100

5. Research Type

The research carried out is mainly secondary research. The required data has been extracted from moneycontrol.com, yahoofinance.com, www.nseindia.com.

6. Theoretical Framework

According to Fama French equation the excess expected return on a portfolio is Rp-Rf = a+ a1 (Rm-Rf) + a2 (SMB) +a3 (HML) +e. Here Rp-Rf is the dependent variable while Rm-Rf, SMB and HML are the explanatory variables. a1, a2 and a3 are the slopes of Rm-Rf, SMB and HML respectively which capture that sensitivity of returns towards market risk premium, size effect and value effect.

Dependent variable i.e. R_p-R_f is regressed against independent variables R_m-R_f, SMB and HML.

TESTING THE ASSUMPTIONS OF LINEAR REGRESSION MODEL

Since the correlation coefficients are neither greater than 0.7 nor less than -0.7 therefore there is weak correlation among dependent variables. Thus, there is no problem of multicollinearity.

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.526144	0.0000
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

Unit Root Testing For Small Portfolio-Rp_Rf

- Null hypothesis: Dependent variable Rp-Rf has a unit root.
- Sincep<0.05werejectthenullhypothesisandacceptthealternatei.e.thedatafor Rp-Rf is stationary at level
- Also the value of t-stats is greater than critical values at different significant levels.

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.196683	0.0000
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

*MacKinnon (1996) one-sided p-values.

- Null hypothesis: Dependent variable Rm-Rf has a unit root.
- Since p<0.05 we reject the null hypothesis and accept the alternate i.e. the data for Rm-Rf is stationary at level
- Also the value of t-stats is greater than critical values at different significant levels

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.150152	0.0000
Test critical values:	1% level	-3.548208	
	5% level	-2.912631	
	10% level	-2.594027	

*MacKinnon (1996) one-sided p-values.

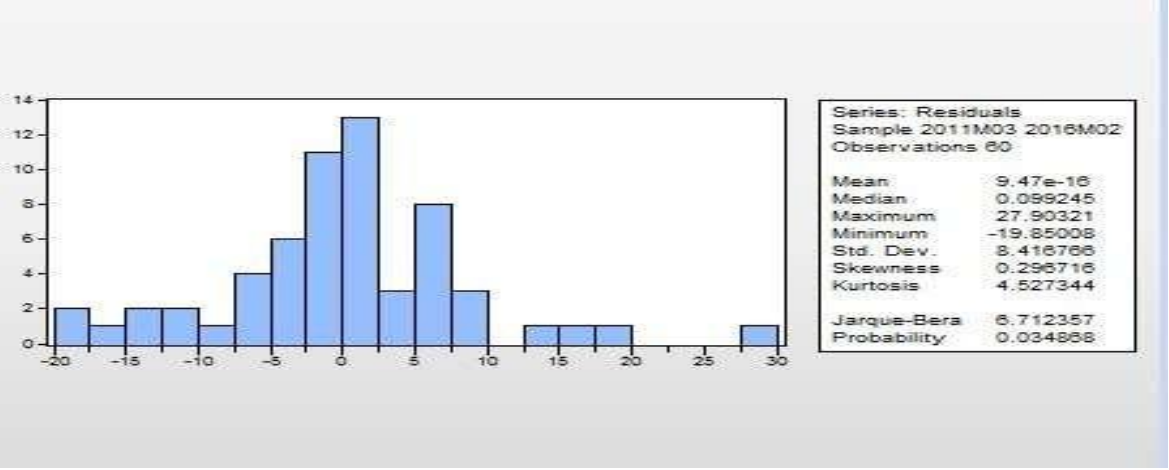
	HML	SMB	RM_RF
HML	1.000000	0.303702	-0.644667
SMB	0.303702	1.000000	-0.117899
RM_RF	-0.644667	-0.117899	1.000000

- Null hypothesis: Dependent variable SMB has a unit root.
- Since p<0.05 we reject the null hypothesis and accept the alternate i.e. the data for SMB is stationary at level
- Also the value of t-stats is greater than critical values at different significant levels.

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.322728	0.0000
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

*MacKinnon (1996) one-sided p-values.

- Null hypothesis: Dependent variable HML has a unit root.
- Since p<0.05 we reject the null hypothesis and accept the alternate i.e. the data for HML is stationary at level.
- Also the value of t-stats is greater than critical values at different significant levels.



Jarque Bera Normality Test

- Residual diagnostics using Jarque bera test is used to infer the characteristics of the data.
- Skewness value of 0.296 indicates that the data is positively skewed.

- Kurtosis value of 4.52 indicates leptokurtic nature of the data.
- Since the Jarque bera test probability is less than 0.05, therefore we reject the null hypothesis and accept the alternate hypothesis. Therefore the data is not normally distributed.

The table below represents the results when R_p-R_f for SL, SM and SH portfolios is regressed against dependent variables SMB, HML and R_m-R_f.

Dependent Variable: RP_SL_SM_SH__3
Method: Least Squares
Date: 04/01/17 Time: 00:09
Sample: 2011M03 2016M02
Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.23725	1.310625	10.09995	0.0000
HML	-0.078889	0.033207	-2.375689	0.0210
SMB	0.301393	0.069055	4.364545	0.0001
RM_RF	3.477181	0.311987	11.14527	0.0000

R-squared	0.835000	Mean dependent var	4.917875
Adjusted R-squared	0.826161	S.D. dependent var	20.72064
S.E. of regression	8.639274	Akaike info criterion	7.214855
Sum squared resid	4179.675	Schwarz criterion	7.354478
Log likelihood	-212.4456	Hannan-Quinn criter.	7.269469
F-statistic	94.46457	Durbin-Watson stat	1.865969
Prob(F-statistic)	0.000000		

Regression model for big stock portfolios: **Dependent variable Rp-Rf for big portfolios is regressed against explanatory variables**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.41225	1.300459	8.006594	0.0000
HML	-0.078678	0.032949	-2.387847	0.0203
SMB	-0.699117	0.068519	-10.20325	0.0000
RM_RF	3.470254	0.309567	11.21002	0.0000

R-squared	0.892595	Mean dependent var	2.218209
Adjusted R-squared	0.886841	S.D. dependent var	25.48305
S.E. of regression	8.572263	Akaike info criterion	7.199281
Sum squared resid	4115.087	Schwarz criterion	7.338904
Log likelihood	-211.9784	Hannan-Quinn criter.	7.253895
F-statistic	155.1305	Durbin-Watson stat	1.902765
Prob(F-statistic)	0.000000		

The value of R square of 89% which is the coefficient of determination indicates that the model is workable. Similarly, the t-statistics probability for each independent variable is less than 0.05 implying individual significance of each of these in explaining the returns of large stock portfolios. F-stats probability is also less than 0.05 implying joint significance of all the

independent variables. All the remaining tests which were conducted for small stock portfolio have been similarly carried for big stock portfolio giving same results.

Conclusions

The aim of our study was to examine the extent to which the internal and external factors hold true for the Indian stock market. The three-factor model which justifies the return of an asset/portfolio as propounded by Fama French has a better explanation as compared to the single factor model which takes into account only the market risk. However, given the fact that the coefficient value of R_m-R_f (market risk premium) which depicts the sensitivity of returns to the market risk is greater than the coefficient values of HML and SMB which represent sensitivity to value of the firm and size of the firm respectively. The greater value of R_m-R_f (market risk premium) is suggestive of the fact that in the three factors considered market risk premium which is an external factor is still an important variable in predicting the asset returns. Hence, the usefulness of CAPM model cannot be ignored.

In case of small stock portfolios Fama French has been successful in estimating the returns accurately to a great extent. However, the difference in actual and predicted returns is indicative of the fact that there are still some other important factors which have not been included in the model capable of explaining the gap in returns. These factors could be macroeconomic factors such as GDP, inflation, foreign exchange rates etc. and internal factors such as price earnings ratio of the company, dividend yield, good/bad news about the company, stock split etc.

Considering the period of study in terms of actual annual return stocks classified as big stock portfolios have outperformed small stock portfolios in all the years except 2014-2015.This is contrary to popular theory which states that smaller stocks outperform bigger stocks. This difference may be due to short time period covered in the study and difference in categorization of companies as small and big.

In case of small portfolios the actual annualized returns are less than the predicted returns except in year 2014.The gap between estimated and actual returns was the highest in the year2. In case of big stock portfolios the actual returns are higher than predicted returns except 2012-2013 and2015-2016. In case of small and big stocks portfolio the coefficient of HML carries a negative sign which indicates a negative slope coefficient between excess portfolio returns.

HML which represents the difference between the returns of high book to market value stock portfolio and low book to market value portfolio indicates that co.'s which have weak earnings have high book to mark et value ratio, which is validated by the negative sign of HML coefficient. In case of small stock portfolio the coefficient of SMB carries a positive sign indicating a positive slope coefficients between excess portfolio returns and difference in returns of small stock portfolio and big stock portfolio. Previous researches suggest that small size firms earn higher returns as compared to large sized firms due to differences in risk faced by them.

Thus, the positive coefficient of SMB justifies the above findings. As per expert opinions the current scenario is such that the small and midcap stocks look more vulnerable than large cap stocks which were subject to early cycle rallies on account of domestic recovery expectations.

References

Pandey, I. M. (2002). Is There Seasonality in the Sensex Monthly Returns. IIMA Working Paper, IIM Ahmedabad.

Lazar. D., Julia P., and Jeyapaul, J. (2006). SENSEX Monthly Return: Is there Seasonality? Indian Institute of Capital Markets 9th Capital Markets Conference Paper.

Ash Narayan Sah (2009). Stock Market Seasonality: A Study of the Indian Stock Market.

Poshakwale Sunil (1996). Evidence on Weak Form Efficiencyand Day of the Week Effect inthe Indian Stock Market. Finance India, Vol. X No. 3, pp. 605-616.

Ariel, Robert A. (1987). A Monthly Effect in Stock Returns. Journal of Financial Economics. Vol. 18, pp. 161–74.