A STUDY ON PERFORMANCE EVALUATION OF DIFFERENT SECTORAL INDICES IN NATIONAL STOCK EXCHANGE

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***Abstract*: Financial expert around the world have developed numerous approaches to estimate the expected return of stock. The objective of this paper is to estimate the expected return and compare 5 different sectors listed in National Stock Exchange (NSE).namely sectors like Nifty Auto, Nifty Energy, Nifty Bank, Nifty FMCG and Nifty IT, 5 securities from each sector is selected for calculating the expected return. Speculation made on securities is dominatingly expanding with developing enthusiasm on Savings and their requirement for an extra income. Financial specialists are prepared to invest on securities to create exceptional yield, yet the vulnerability in the financial exchange is being an obstacle for them to do as such. The serious issue looked by speculator is the absence of information on constructing a Portfolio for their venture. CAPM illustrates that the return on stock is the sum of the risk free rate plus beta times the excess return. However the beta value for the stock estimates the instability of the stock and decides the degree of risk associated with the stock. The beta times the overabundance return in the CAPM formula expresses the significance of the stock beta in their expected return. Here the beta value is measured to determine the movement of stock in their respective market. The data is collected for the securities listed in NSE for the time frame of 10 years from 2010 to 2020 to estimate the expected return on the stock. The ranking of securities are done based on the CAPM expected return for the above specified period. The study further focuses on the determining the coefficient of determination (R^2) to find the variance in proportion of dependent variable to that of independent variable.**

***Keywords*: CAPM, Beta, NSE, R square, Sectoral indices**

INTRODUCTION:

The Capital Asset Pricing Model (CAPM) is a model that depicts the connection between the expected return and risk of investing in a security. It shows that the expected return on a security is equal to the risk-free return in addition with risk premium, which relies upon the beta of that security. The CAPM model is utilized for figuring the expected returns of an asset. It depends on the possibility of systematic risk that speculators should be made up for a risk premium. A risk premium is a pace of return more prominent than the risk-free rate. When investing, speculators want a higher risk premium when taking on progressively risky ventures. This model presents a simple theory that conveys a basic outcome. By investing in one stock as opposed to another is that one stock is riskier. As anyone might expect, the model has come to rule current financial theory.

The risk-free rate, which is regularly equivalent to the yield on a 10-year government security. The risk-free rate ought to compare to the nation where the investment is being made, and the development of the security should coordinate the time horizon of the investment. A risk premium is the return in excess of the risk-free rate of return an investment is relied upon to yield an asset's risk premium is a type of pay for speculators who tolerate the additional risk, contrasted with that of a risk-free asset, in a given investment. Beta is a numeric worth which quantifies the fluctuations and the responsiveness of a stock's cost to changes in the general market. A stock's beta will change after some time since it contrasts the stock's arrival and the profits of the general market. The market Index has a beta of 1.0, and individual stocks are positioned by the amount they digress from the market. This makes the investor to choose whether he needs to go for the more riskier stock that is significantly related with the market, beta over 1, or with a less unpredictable one beta underneath 1. That is the stock that swings more than the market after some time has a beta above 1.0. In the event that a stock does not moves exactly with the market, when the stock's beta is under 1.0. High-beta stocks should be less secure yet give better yield potential, low-beta stocks asserts less risk yet in addition lower returns. Risk is a significant thought in holding any portfolio. The risk in holding protections is for the most part connected with the likelihood that acknowledged returns will be not exactly the profits anticipated. Risks can be Systematic risk and Unsystematic risk.

CAPM Formula:

$$R_i = R_f + \beta * (R_m - R_f)$$

Where,

i. R_i is the expected return on a security
ii. R_f is the Risk-free rate

iii. $\mathbf{R_m}$ is the expected return of the market
iv. **β** is the beta of the security
v. $\mathbf{(R_m - R_f)}$ is the equity market premium

Beta Formula:

Beta is calculated by:

$$\text{Beta coefficient } (\beta) = \frac{\text{covariance (Re,Rm)}}{\text{variance (Rm)}}$$

Where,

i. R_e is the return on an individual stock - Dependent Variable.
ii. R_m is the return on the overall market - Independent Variable.
iii. Variance is the square of standard deviation and how far the market's data points spread-out from their average value
iv. Covariance is how changes in a stock's returns are related to changes in the markets return and it is the statistic that measures how two variables co-vary,

and is given by:

$$Cov(x,y) = [1/(N-1)] \sum_{t=1}^{N} [x_t - \bar{x}][y_t - \bar{y}]$$

Where, N denotes the total number of observations, and $\bar{x}$ and $\bar{y}$ respectively represent the arithmetic averages of x and y.

REVIEW OF LITERATURE:

Dr. S Poornima and Swathiga P, june(2017) this examination is on connection among risk and return investigation of choose stocks on NSE exploitation capital quality valuation model this investigation shows the connection of risk and return investigation causes the investor to choose up the securities bolstered her choice. The study provides data concerning the performance of assorted stocks within the market in terms of risk and come with the assistance of CAPM. The study measures the link between risks and return analysis of elect firms in 2 sectors listed in NSE. Within the case of automobile sector firms here, investors may choose Maruti Suzuki Ltd (5.31%) and Hieronymus Bosch (3.48%). within the case of IT sector firms here, he will choose HCL Technologies (1.02%) severally. Since the scientist has elect solely 2 sectors like automobile and IT Sectors, wherever the car firms has performed higher and has accumulated growth within the market when put next to that Sector has negative average returns.

Chintan A. Shah, june (2015) Development of Optimal Portfolio Using Sharpe Index Model and CAPM for BSE Top 15 Securities this investigation was mostly about the Sharpe model gives accurate number of securities alongside weightage for investment, while this is beyond the realm of imagination in CAPM model. They are utilized the graphic research structure and optional information is utilized as a significant thing right now. CAPM model just recommend various securities where financial specialist can contribute however it doesn't give a specific portfolio and weightage to investment in various securities. In view of the investigation of profits of top 15 BSE securities from past years information utilizing Sharpe Model, a financial specialist can put resources into following securities. HDFC Bank Ltd, HDFC Ltd, TCS, ICICI Bank Ltd, and TATA Motors.

Hui-Shan Lee1, Fan-Fah Cheng, Shyue-Chuan Chon, 2016 Markowitz Portfolio Theory and Capital Asset Pricing Model for Kuala Lumpur Stock Exchange: A Case Revisited the idea right now speculators could utilize CAPM to gauge the conduct and the precise risk of the stocks in Malaysia before putting resources into financial exchange. This could be an approach to limit their drawback risk as they comprehend the stock pattern of the organization and consequently contribute objectively. Moreover, administrators in the organizations of Malaysia can utilize CAPM as an intermediary to assess their stock return and execute the correct strategy in their administration so as to augment benefit simultaneously increment investor riches expansion. Besides, it is recommended to apply portfolio expansion to lessen the unsystematic risk. Generally, portfolio broadening could develop the speculators' certainty towards the venture choice and to build up a sound speculation money related market in helping Malaysia to accomplish its strategic be a created nation in 2020.

Dr.Rupinder Katoch, january (2018) The Capital Asset Pricing Model: An Empirical Test on Indian Stock Market and the investigation finishes up blended reactions to the uses of CAPM in Indian Stock Market. The examination began with the point of holding CAPM on Indian Stock Market viz. to test whether higher beta yields higher expected return and the catch rises to zero. The outcomes by and large approve the CAPM's forecasts that higher risk (beta) is related with a more significant level of return.

Hayat Khan, Itbar Khan, Hassan Ali Raza, Rashid Jan, Amir Sohail, December (2016) Capital asset pricing model (CAPM) versus Fama and French three-factor model. An empirical comparison in Pakistani equity market. Three book keeping factors, size premium, book-to-advertise value premium and market premium, empower us to catch the normal returns over the period. These models can be utilized as benchmark for portfolio execution assessment by support chiefs and speculators. Reserve administrators and speculators can assess their portfolios by contrasting their portfolio returns with the benchmark model with comparative size, book-to-advertise value attributes. In the event that their portfolio returns are higher than the benchmark, they can outflank the

market. Fama and French discover the circumstance of precisely the un-explained parts of Sharp's CAPM, which have somewhat exploratory verification for recommendation. In any case, our outcome shows that CAPM, Fama and French three on-screen characters model have great spellbinding force. Here we are taking fifty organization's month to month normal returns and three autonomous factors; figure parameters, P-qualities and R-Square through straightforward relapse. The outcome indicated that these models are performing great to ascertain organizations stock's returns recorded on Karachi stock trade, for the whole investigation time frame January 2003 till December 2012. they are here contrasting models based on parameter α (alpha), if α (alpha) is irrelevant the model is said to be right. Tables finally show that six alphas for Fama and French 3 - factor model, five for CAPM model are inconsequential.

RESEARCH DESIGN:

PROBLEM DEFINITION:

To estimate the return and rank them based on their past returns in their respective markets and to find the performance and compare the same among the different sectoral indices in NSE.

NEED OF THE STUDY:

a. To understand the importance for the measure of performance of the securities.
b. To understand the significance for the proportion of beta value for the securities.
c. To know how beta value influence the individual stock in the corresponding market.
d. To know the level of deviation in securities to that of the market which they have occupied.
e. To find the variance in proportion of dependent variable to that of independent variable.

OBJECTIVE OF THE STUDY:

a. To select securities from 5 different sectoral indices listed in NSE.
b. To estimate the beta coefficient value for each securities.
c. To find the coefficient of determination (R^2) for selected securities.
d. To estimate the expected return for each securities using CAPM.
e. To rank the securities based on their expected return.

LIMITATIONS OF THE STUDY:

Every research has its own limitations. The limitations of this studies are:

a) The study covers only 25 listed companies of NSE.
b) This study is limited to the return analysis of 25 stocks.
c) Past 10 years data has been considered for the calculation of return analysis using CAPM.
d) In the study, five sectors have been chosen. The study covers 5 sectors based on NSE capitalization from each sectors five companies have been taken.

DATA:

Here, researcher has used Descriptive Research Design because in this research design the researcher has got very specific objectives and clear-cut data requirements. Daily data for 25 securities from NSE are collected for a time frame of 10 years that is from February 1st 2010 to January 31st 2020. Data collected is a secondary data and been collected from the NSE website.

The selected securities from different sectoral indices from NSE:

Table 1.1 for selected securities from different sectoral indices from NSE

S.no	SYMBOL	SECTOR	S.no	SYMBOL	SECTOR
1	BAJAJ-AUTO	AUTO	14	POWERGRID	ENERGY
2	EICHERMOT	AUTO	15	RELIANCE	ENERGY
3	HEROMOTOCOP	AUTO	16	BRITANNIA	FMCG
4	MARUTI	AUTO	17	HINDUNILVR	FMCG
5	TATAMOTORS	AUTO	18	ITC	FMCG
6	AXISBANK	BANK	19	TATAGLOBAL	FMCG
7	ICICIBANK	BANK	20	NESTLEIND	FMCG
8	KOTAKBANK	BANK	21	HCLTECH	IT
9	SBIN	BANK	22	INFY	IT
10	YESBANK	BANK	23	TCS	IT
11	BPCL	ENERGY	24	TECHM	IT
12	IOC	ENERGY	25	WIPRO	IT
13	NTPC	ENERGY			

ESTIMATION OF CAPM ESTIMATED RETURN:
The expected return is obtained for every individual securities from the following formula:

$$R_i = R_f + \beta * (R_m - R_f)$$

ESTIMATION R-SQUARED AND ADJUSTED R-SQUARED:
R-squared is a factual proportion of how close the information is to the fitted relapse line. It is otherwise called the coefficient of assurance, or the coefficient of numerous conclusions for different relapses. 100% shows that the model clarifies all the fluctuation of the reaction information around its mean. So also the balanced R-squared is an altered variant of R-squared that has been balanced for the quantity of indicators in the model. The balanced R-squared increments just if the new term improves the model more than would be normal by some coincidence. It diminishes when an indicator improves the model by not exactly expected by some coincidence.

ESTIMATION OF CAPM ESTIMATED RETURN:

$$\text{Beta coefficient } (\beta) = \frac{\text{covariance (Re,Rm)}}{\text{variance (Rm)}}$$

Table 1.2 for beta value:

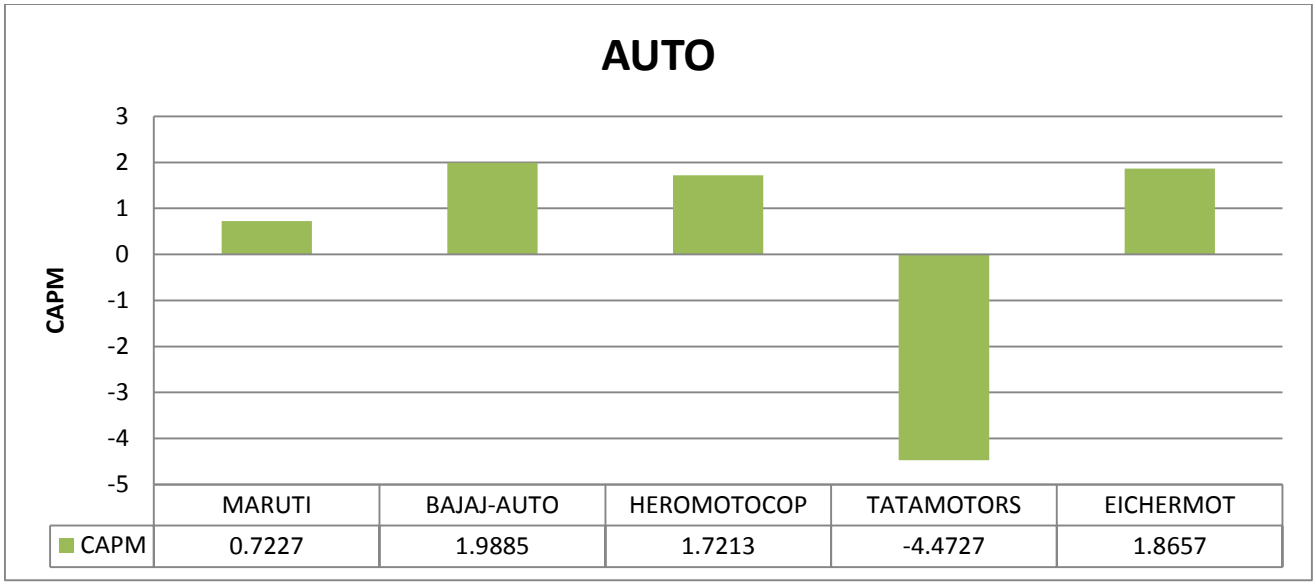
S.no	SYMBOL	SECTOR	BETA COEFFICIENT (β)
1	BAJAJ-AUTO	AUTO	0.7487
2	EICHERMOT	AUTO	0.7646
3	HEROMOTOCOP	AUTO	0.7833
4	MARUTI	AUTO	0.9126
5	TATAMOTORS	AUTO	1.5854
6	AXISBANK	BANK	1.1691
7	ICICIBANK	BANK	1.2189
8	KOTAKBANK	BANK	0.7787
9	SBIN	BANK	1.1402
10	YESBANK	BANK	1.2855
11	BPCL	ENERGY	0.9383
12	IOC	ENERGY	0.8675
13	NTPC	ENERGY	0.6512
14	POWERGRID	ENERGY	0.4937
15	RELIANCE	ENERGY	1.2059
16	BRITANNIA	FMCG	0.4407
17	HINDUNILVR	FMCG	0.7940
18	ITC	FMCG	1.2883
19	TATAGLOBAL	FMCG	0.5957
20	NESTLEIND	FMCG	0.3706
21	HCLTECH	IT	0.9057
22	INFY	IT	1.1766
23	TCS	IT	0.9708
24	TECHM	IT	0.7639
25	WIPRO	IT	0.7799

INTERPRETATION:
A Beta Coefficient value greater than 1.00 indicates that the stock is more volatile than the market, and Beta Coefficient value less than 1.00 is less volatile than the market. A beta Coefficient value of 1.5 means that a stock's excess return is expected to move 1.5 times the market excess returns. From the above table 1.2 we can infer that there are only 9 securities (TATAMOTORS, ITC, YESBANK, ICICIBANK, RELIANCE, INFY, AXISBANK & SBIN) have a beta value greater than 1 which indicates that these securities are more volatile than the market as a whole and to be riskier. TATAMOTORS from automobile sector has the highest beta value of 1.5854.

ANALYSIS AND INTERPRETATION:

Table 1.3 Showing results for Automobile Sector on the basis of expected return.

S.no	SYMBOL	COEFFICIENT OF DETERMINATION (R^2)	STANDARD ERROR	CAPM EXPEXTED RETURN (%)	RANKING
1	MARUTI	0.436833	0.012810	0.7227	4
2	BAJAJ-AUTO	0.250404	0.016029	1.9885	1
3	HEROMOTOCOP	0.313033	0.014357	1.7213	3
4	TATAMOTORS	0.438276	0.022177	-4.4727	5
5	EICHERMOT	0.202101	0.018787	1.8657	2

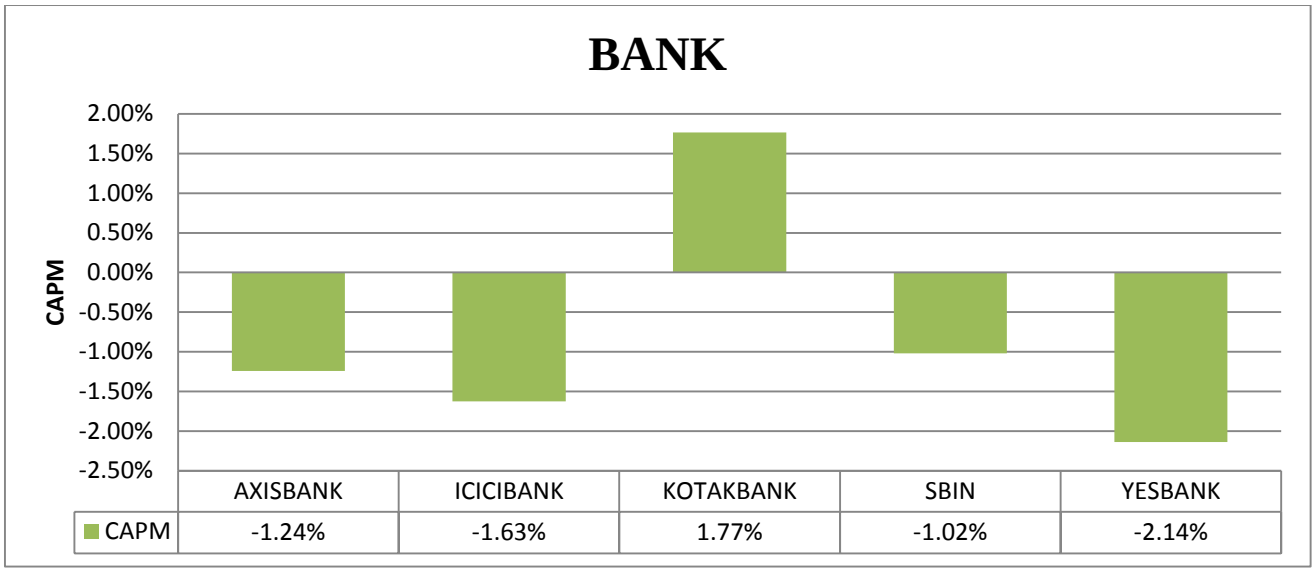


INTERPRETATION FROM AUTOMOBILE SECTOR:

From the above table 1.3 we can infer that BAJAJ-AUTO has a higher expected return of 1.9885% from the historical data. 4 securities namely BAJAJ-AUTO, EICHERMOT, HEROMOTOCOP & MARUTI have a positive expected return while TATAMOTORS have a negative expected return. We can also interrupt that MARUTI & TATAMOTORS has a highest proportion of the variance 0.436833 & 0.438276 respectively i.e. it suggest that the model is good in explaining more than 43% of the size effect among the other listed securities in the market. While EICHERMOT has the lowest proportion of the variance 0.202101.

Table 1.4 Showing results for Bank Sector on the basis of expected return.

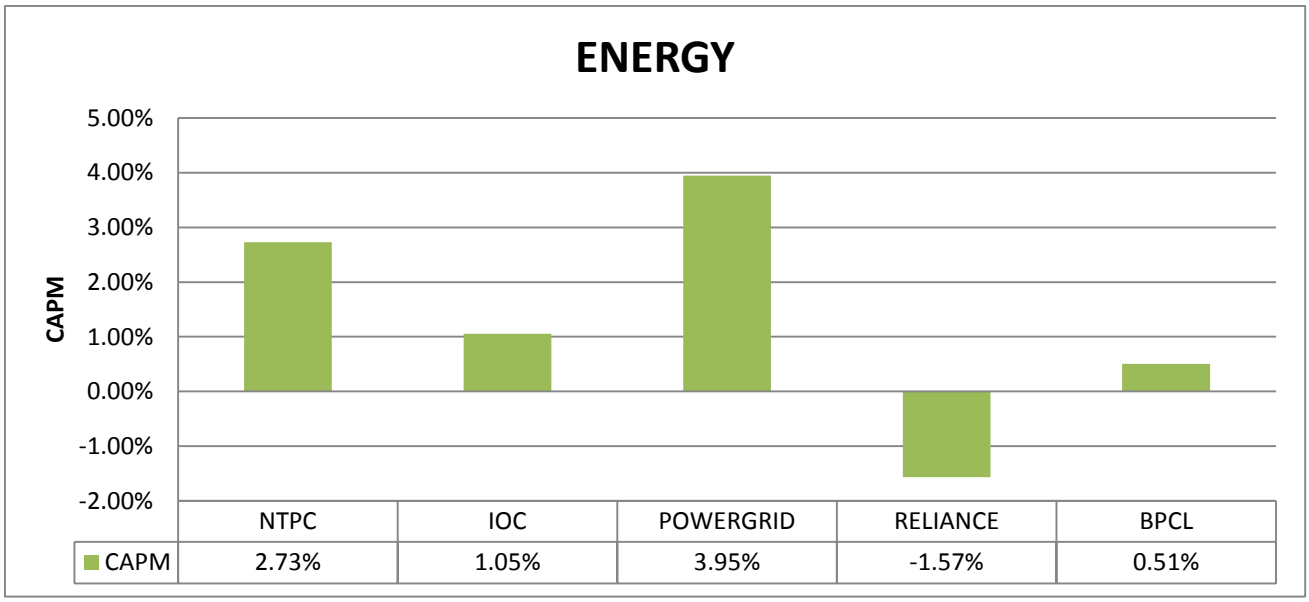
S.no	SYMBOL	COEFFICIENT OF DETERMINATION (R^2)	STANDARD ERROR	CAPM EXPEXTED RETURN (%)	RANKING
1	AXISBANK	0.382976	0.020427	-1.2426%	3
2	ICICIBANK	0.318463338	0.021205306	-1.6271%	4
3	KOTAKBANK	0.242609986	0.018927833	1.7670%	1
4	SBIN	0.324714158	0.022629043	-1.0203%	2
5	YESBANK	0.254005242	0.030323507	-2.1400%	5



INTERPRETATION FROM BANK SECTOR:
From the above table 1.4 we can infer that KOTAKBANK has a higher expected return of 1.77% from the historical data. Only KOTAKBANK have a positive expected return while the other 4 securities (AXISBANK, ICICIBANK, SBIN & YESBANK) have a negative expected return. We can also interrupt that AXISBANK, SBIN & ICICIBANK has a highest proportion of the variance 0.382976, 0.324714158 & 0.318463338 respectively i.e. it suggest that the model is good in explaining more than 30% of the size effect among the other listed securities in the market. While KOTAKBANK & YESBANK has the lowest proportion of the variance 0.242609986 & 0.254005242.

Table 1.5 Showing results for Energy Sector on the basis of expected return.

S.no	SYMBOL	COEFFICIENT OF DETERMINATION (R^2)	STANDARD ERROR	CAPM EXPEXTED RETURN (%)	RANKING
1	NTPC	0.247775263	0.013682745	2.7282%	2
2	IOC	0.182563002	0.02209437	1.0534%	3
3	POWERGRID	0.187858461	0.012315874	3.9474%	1
4	RELIANCE	0.568169964	0.012670002	-1.5663%	5
5	BPCL	0.180352543	0.024088842	0.5052%	4

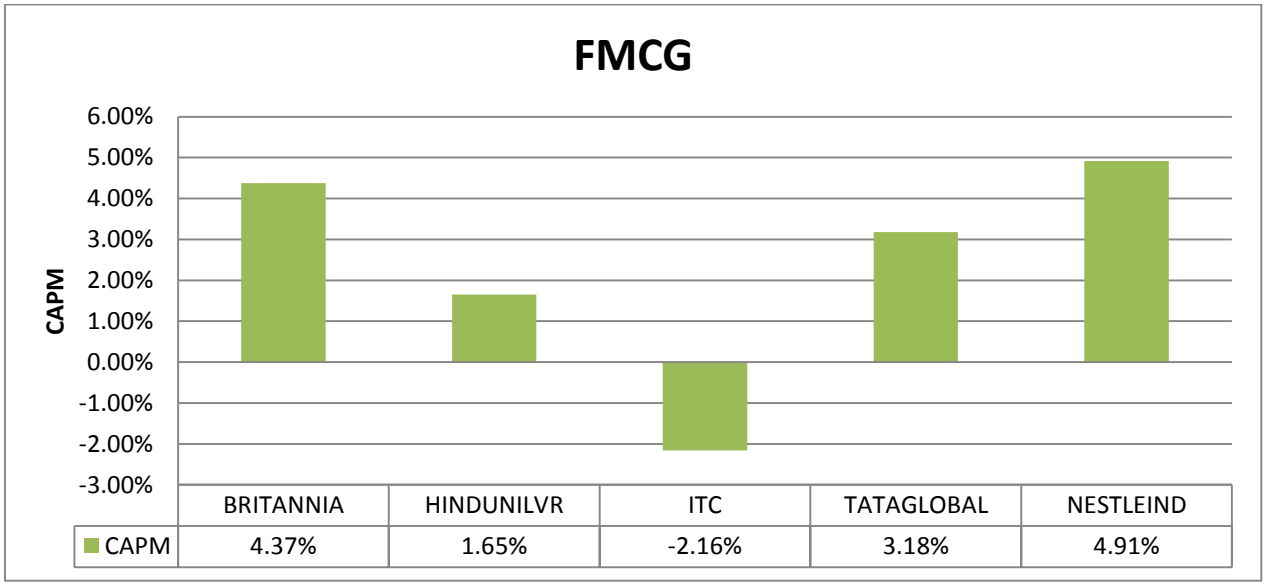


INTERPRETATION FROM ENERGY SECTOR:
From the above table 1.5 we can infer that POWERGRID has a higher expected return of 3.95% from energy sector. 4 securities namely NTPC, IOC, POWERGRID & BPCL have a positive expected return while RELIANCE has a negative expected return. We can also interrupt that RELIANCE has a highest proportion of the variance 0.568169964 i.e. it suggest that the model is good in explaining more than 56% of the size effect among the other listed securities in the market. While BPCL has the lowest proportion

of the variance 0.180352543 that can be predicted from the corresponding market and suggests that the model is not too much good in explaining the size effect.

Table 1.6 Showing results for FMCG Sector on the basis of expected return.

S.no	SYMBOL	COEFFICIENT OF DETERMINATION (R^2)	STANDARD ERROR	CAPM EXPEXTED RETURN (%)	RANKING
1	BRITANNIA	0.034494432	0.023986032	4.3745%	2
2	HINDUNILVR	0.318780487	0.011941053	1.6523%	4
3	ITC	0.479759996	0.013802122	-2.1566%	5
4	TATAGLOBAL	0.05092874	0.02645661	3.1800%	3
5	NESTLEIND	0.068004725	0.014113285	4.9148%	1

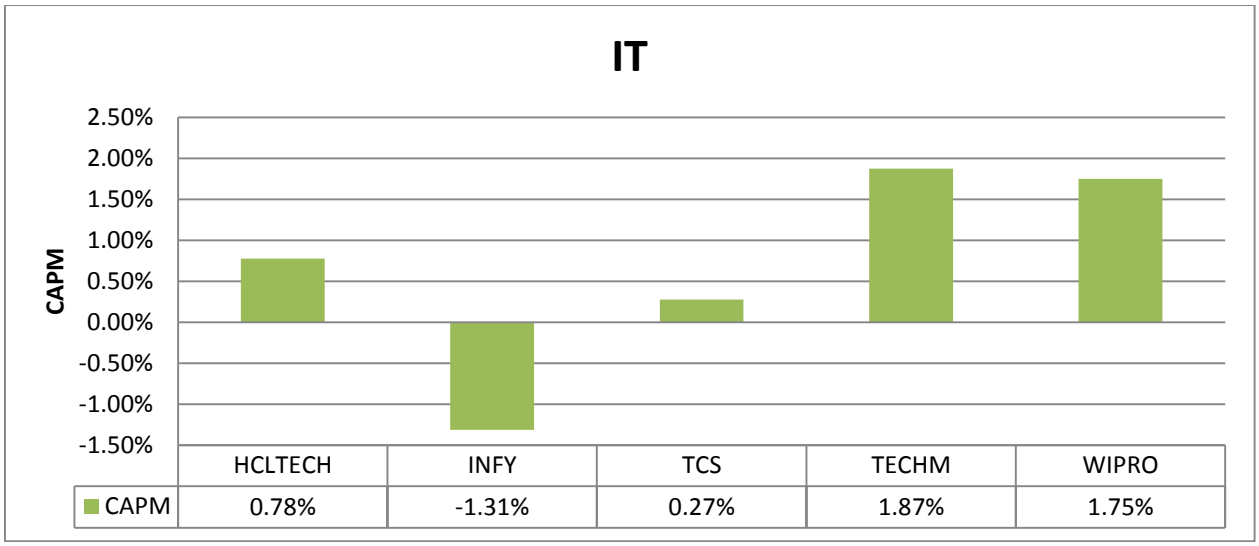


INTERPRETATION FROM FMCG SECTOR:

From the above table 1.6 we can infer that NESTLEIND has a higher expected return of 4.91% from FMCG sector. 4 securities namely BRITANNIA, HINDUNILVR, TATAGLOBAL & NESTLEIND have a positive expected return while ITC has a negative expected return. We can also interrupt that ITC has a highest proportion of the variance 0.479759996 i.e. it suggest that the model is good in explaining more than 47% of the size effect among the other listed securities in the market. While BRITANNIA has the lowest proportion of the variance 0.034494432 that can be predicted from the corresponding market and suggests that the model is not too much good in explaining the size effect.

Table 1.7 Showing results for IT Sector on the basis of expected return.

S.no	SYMBOL	COEFFICIENT OF DETERMINATION (R^2)	STANDARD ERROR	CAPM EXPEXTED RETURN (%)	RANKING
1	HCLTECH	0.239914603	0.01966799	0.7776%	3
2	INFY	0.353401871	0.019416337	-1.3136%	5
3	TCS	0.404850132	0.014360576	0.2749%	4
4	TECHM	0.15282022	0.021943357	1.8724%	1
5	WIPRO	0.215438082	0.018157097	1.7490%	2



INTERPRETATION FROM IT SECTOR:

From the above table 1.7 we can infer that TECHM has a higher expected return of 1.87%. Four securities namely HCLTECH, TCS, TECHM & WIPRO have a positive expected return while INFY has a negative expected return. We can also interrupt that TCS has a highest proportion of the variance 0.404850132 i.e. it suggest that the model is good in explaining more than 40% of the size effect among the other listed securities in the market. While TECHM has the lowest proportion of the variance 0.15282022.

TABLE 1.8 SHOWING OVERALL EVALUATIONS OF SECURITIES:

S.no	SYMBOL	SECTOR	BETA	R^2	Standard Error	EXPEXTED RETURN (CAPM) (%)	RANKING
1	AXISBANK	BANK	1.1691	0.3830	0.020427	-1.2426%	19
2	BAJAJ-AUTO	AUTO	0.7487	0.2504	0.016029	1.9885%	6
3	BPCL	ENERGY	0.9383	0.1804	0.024089	0.5052%	16
4	BRITANNIA	FMCG	0.4407	0.0345	0.023986	4.3745%	2
5	EICHERMOT	AUTO	0.7646	0.2021	0.018787	1.8657%	8
6	HCLTECH	IT	0.9057	0.2399	0.019668	0.7776%	14
7	HEROMOTOCOP	AUTO	0.7833	0.3130	0.014357	1.7213%	11
8	HINDUNILVR	FMCG	0.7940	0.3188	0.011941	1.6523%	12
9	ICICIBANK	BANK	1.2189	0.3185	0.021205	-1.6271%	22
10	INFY	IT	1.1766	0.3534	0.019416	-1.3136%	20
11	IOC	ENERGY	0.8675	0.1826	0.022094	1.0534%	13
12	ITC	FMCG	1.2883	0.4798	0.013802	-2.1566%	24
13	KOTAKBANK	BANK	0.7787	0.2426	0.018928	1.7670%	9
14	MARUTI	AUTO	0.9126	0.4368	0.012810	0.7227%	15
15	NESTLEIND	FMCG	0.3706	0.0680	0.014113	4.9148%	1
16	NTPC	ENERGY	0.6512	0.2478	0.013683	2.7282%	5
17	POWERGRID	ENERGY	0.4937	0.1879	0.012316	3.9474%	3
18	RELIANCE	ENERGY	1.2059	0.5682	0.012670	-1.5663%	21
19	SBIN	BANK	1.1402	0.3247	0.022629	-1.0203%	18
20	TATAGLOBAL	FMCG	0.5957	0.0509	0.026457	3.1800%	4
21	TATAMOTORS	AUTO	1.5854	0.4383	0.022177	-4.4727%	25
22	TCS	IT	0.9708	0.4049	0.014361	0.2749%	17
23	TECHM	IT	0.7639	0.1528	0.021943	1.8724%	7
24	WIPRO	IT	0.7799	0.2154	0.018157	1.7490%	10
25	YESBANK	BANK	1.2855	0.2540	0.030324	-2.1400%	23

CONCLUSION:

The study concludes that from the past data we can infer that NESTLEIND & BRITANNIA has the highest expected return of 4.9148% & 4.3745% respectively from the selected securities. These two securities represent the FMCG sector and have a high yield return as far as other sectors are concerned. And also indicates that FMCG sector has ranked further ahead when compared to other sectors which have taken in to consideration for the above study. Apart from FMCG sectors, the energy sectors performs well and yield high return. The banking sector has more number of negative returns and has a low performance with that of other sectors which has been selected for the study. Whereas automobile sector and IT sectors exhibits a moderate performance. As far as coefficient of determination concerned the RELIANCE has a highest proportion of the variance that can be predicted from the corresponding market and suggests that the model is good in explaining the size effect.

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