ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

COMPARISON OF PERFORMANCE OF STOCK RETURNS IN THE INDIAN STOCK MARKET USING CAPM

Payal Dere

Msc Finance Part II, Model College Dombivli

Abstract:

Capital Asset Pricing Model is developed by William Sharpe and John Lintner after understanding the various drawbacks in the Modern Portfolio Theory. Generally, investors do not consider the fundamentals and the strategies while investing and hence do not get the expected returns. The purpose of this study is to provide the judgements about the stock returns by comparing the performance of the stocks in the Indian stock market by applying the CAPM model. The study covered monthly data of Indian companies for 5 year period from 2017 to 2022. The year 2022 was not considered as it was abnormal and outlier year. Jensen's Alpha was used to identify the best stocks. Actual and expected returns were compared to judge the securities and accordingly make the investment decisions. The study found that both the models gives similar results for the sampled stocks except for one. On the whole, the CAPM model could satisfactorily explain the risk-return relationship in the Indian Stock market.

Keywords: *CAPM, Beta, Jensen's Alpha*

Introduction:

The Capital Asset Pricing Model, most popularly known as CAPM, developed in the 1960s by William Sharpe and John Lintner marks the birth of asset pricing theory. Before their breakthrough, there were no asset pricing models built from first principles about the nature of tastes and investment opportunities and with clear testable predictions about risk and return.

There are many drawbacks in Modern Portfolio Theory (MPT) like, portfolios are assessed on variance rather than downside risk; MPT models expected returns based on mathematical calculations based on past data, but it doesn't model market fluctuations; it assumes that investors are risk-averse, completely rational, and have realistic investment returns. Due to these drawbacks CAPM came into existence.

The foundation of the CAPM is the notion that not all risks ought to influence asset prices. Particularly, a risk is not a risk at all, when it is held with other investments in a portfolio and can be diversified away. The CAPM gives us insights about what kind of risk is related to return.

The CAPM divides total risk into two categories: diversifiable risk (measured by beta) and non-diversifiable risk (where investors are reimbursed solely for bearing systematic risk and no extra return is provided for assuming unsystematic risk because it can be easily quantified). Since unsystematic risk can be avoided, CAPM focuses solely on the relationship between systematic risk (beta) and return of a particular security at a particular time.

When an asset is included in a well-diversified portfolio, the CAPM helps to determine the theoretically required

ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

rate of return and, consequently, the asset's price. It also predicts that the expected return on an asset is linearly related to systematic risk, as indicated by the asset's beta, and equals the risk-free rate plus a risk premium.

The model says that there exists a positive relationship between systematic risk and return of a security. The equation of the CAPM which best describe the model is as under:

$$ER = Rf + \beta (Rm - Rf)$$

Where

ER = expected return of investment,

Rf = risk-free rate,

β = beta of the investment,

(Rm − Rf) = market risk premium.

Scope of the Study:

The present study is related to the application of Capital Asset Pricing Model (CAPM) in the context of the Indian Stock Market for a 5 year period starting from 2017 to 2022. The performance of the stocks are studied taking Nifty 50 as the benchmark index. Owing to Covid related disruptions, the year 2020 was not considered as it was an abnormal and outlier year. The data of that year was sharply volatile and this can impact the findings of the study.

Need of the Study:

Investors want to achieve higher returns without taking much risk. Every investor is not skilful and they often fail to receive proper guidance on the investment planning and getting optimum returns. This study will help the investors to analyse the performance of the stocks and make the investment decisions accordingly.

Objectives of the Study:

- To check whether there exists a relationship between risk and return in the Indian Stock Market
- To compare the performance of the stock returns using CAPM
- To judge the securities on the basis of market prices and accordingly make investment decisions.

Limitations of the Study:

- The study is based on secondary data.
- The performance of the stock returns are studied only on the basis of market prices.
- Due to the time constraints, only five-year monthly data was taken for the study.

Literature Review:

Nowadays, stock investors are constantly focusing on how to maximise profits while reducing the risks connected to their investments, even if they are investing in the assets or securities or business projects with higher risks.. Investors are constantly looking for new techniques to quantify the relationship between risk and return on their investments in order to reach this goal. As a result, they use various models for their risk quantifications.

Risk managers have utilised the CAPM extensively in this area to quantify risk and return. Since the development of the CAPM, numerous ardent attempts have been made to assess the validity of CAPM. These efforts have made a significant contribution to the world of finance. The principles of the model are supported by certain studies on the usage of CAPM, but just a few studies directly challenge the model.

Khushboo Raheja (2014) stated that CAPM, as a pricing model, had performed well in few parts of the world, whereas it did not work in the other parts. Monthly data was taken and the returns were calculated taking 91 day treasury bills rate and Nifty 50 as benchmark index. Actual returns, Expected returns and Beta values were calculated and the analysis found that there was no correlation between actual returns of the same securities. The expected returns were not in line with the one which is being set by CAPM, and the returns are not only affected by risk alone, there are other factors like political and economic which influence the returns on a security.

Aanchal Singh examined the validity of CAPM in selected industries in Indian stock market by taking

ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

monthly stock indices, and BSE as its benchmark. A regression was performed in 7 industries for a period of 16 years. The results showed that CAPM was valid in some of the industries and invalid in others.

Basu D and Chawla D (2010) investigated 50 stocks by making 10 portfolios over 5 years and the findings concluded that CAPM does not accomplish as per anticipation. The study suggested that CAPM is not valid criteria for Indian stock market and Fama French 3 factor model and Carhart's 4 factor model can be used to add more variables and check the validity of the same.

Hussain and Islam (2017), "Is the Capital Asset Pricing Model valid in the Indian context?" the study analysed the validity of CAPM by taking 63 Indian companies listed in National Stock Exchange for the period of 13 years from 2003 to 2015. Fama and McBeth model was used to create 4 hypotheses. Time-series Regression was used for beta estimation. The results showed the absence of relationship between beta and risk therefore concluded that CAPM is not for National stock exchange for the 2003 to 2015 turnover.

Yash Pal Taneja (2010) examined the Capital Asset Pricing Model and Fama French Model by taking a sample of 187 companies for 5 years and S&P CNX 500 as index. Fama French 3 factor model was used and the study showed that efficiency of Fama French Model, for being a good predictor, cannot be ignored in India but either of the two factors (size and value) might improve the model.

Research Methodology:

The research is quantitative and analytical. Secondary data and random sampling method was used in the study. The sample consists of ten stocks. Monthly stock returns are calculated using closing prices of the stocks. Nifty 50 is taken as the benchmark to compare the performance of the sampled stocks.

Mean monthly Rate of Return on one year Government Bond is taken as Risk Free Rate. The period covered in the study is from January 2017 to December 2022. Ten different sectors (Pharmaceutical, Airlines, FMCG, Telecom, Metals and Mining, Insurance, Biotechnology, Information Technology, Chemical and Material industry) were taken based on the availability of adequate data which was then regressed with market index.

CAPM is applied to test the performance of the stock returns. Data is analysed using the CAPM formula. Two models are prepared, and the judgements are formed on the basis of these models. The monthly closing prices of the stocks as well as the index are used to calculate the returns.

1st model is Jensen's Alpha.

Jensen's Alpha is used to analyse which stock performs better during the regression period.

The formula for CAPM is as follows:

$$R = Rf + ß\,(Rm - Rf)$$

Rearranging the formula, we get

$R = Rf + ßRm - ßRf$

$R = (1-ß)\,Rf + ßRm$

Considering $(1-ß)\,Rf$ as α,

$R = \alpha + ßRm$

The intercept α equals $Rf\,(1-ß)$ A comparison of the intercept α to the $Rf\,(1-\beta)$ provides a measure of the stock's performance as per the CAPM.

Thus,

if $\alpha > Rf\,(1-\beta)$, the stock did better than expected during the regression period

if $\alpha = Rf\,(1-\beta)$, the stock did as well as expected during the regression period

if $\alpha < Rf\,(1-\beta)$, the stock did worse than expected during the regression period

For the purpose of this analysis, the stock prices are first transformed into returns and then the excess return is computed by deducting the risk free rate of return of one year government bond from stock return.

Alpha (α) and Beta (β) of the stocks are calculated using the intercept and slope formula respectively. Alpha is

ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

then compared with Beta and the performance of the stocks is measured.

2nd model is Comparison of Actual Returns and Expected Returns.

The valuation of stocks is determined using this model, which will help investors in their buying and selling decision.

Actual returns are calculated as follows:

$$\text{Actual Return} = \frac{\text{next price - current price}}{\text{current price}}$$

Expected return is the CAPM formula.

The difference between expected and actual returns is calculated

If Expected Return – Actual Return is positive, then stock is undervalued

If Expected Return – Actual Return is negative - stock is overvalued

If the stock is undervalued, investor is expected to buy the stock and if it is overvalued, investor can sell or hold the stock.

Analysis and Discussion:

Table 1 – Computation of alpha, beta and Rf (1- ß)

Calculation of Alpha, Beta and Rf (1- ß)				
Sr No.	Stocks	Alpha	Beta	Rf(1-ß)
1	Torrent Pharmaceuticals	0.0052	0.9427	0.0003
2	InterGlobe Aviation (Indigo)	0.0030	1.2241	-0.0011
3	Dabur	0.0033	0.6292	0.0018
4	Indus Tower	-0.0089	0.2793	0.0035
5	Vedanta Ltd	-0.0049	1.0079	0.0000
6	ICICI Prudential Life Insurance Comapany	-0.0034	0.6762	0.0016
7	Biocon	0.0034	0.5170	0.0024
8	LTI MindTree	0.0202	2.1666	-0.0057
9	Pidilite Industries	0.0113	1.0407	-0.0002
10	Ambuja Cement	0.0047	0.9420	0.0003
	Nifty 50		1.0000	

The intercept (α) is compared with Rf (1-ß) to measure the stock's performance as per CAPM.

The results are as follows,

Table 2 – Comparison of alpha and Rf (1 - ß)

Sr No.	Stocks	α	Rf (1-ß)	Impact
1	Torrent Pharmaceuticals	0.0052	0.0003	better
2	InterGlobe Aviation (Indigo)	0.0030	-0.0011	better
3	Dabur	0.0033	0.0018	better
4	Indus Tower	-0.0089	0.0035	worse
5	Vedanta Ltd	-0.0049	0.0000	worse
6	ICICI Prudential Life Insurance Comapany	-0.0034	0.0016	worse
7	Biocon	0.0034	0.0024	better
8	LTI MindTree	0.0202	-0.0057	better
9	Pidilite Industries	0.0113	-0.0002	better
10	Ambuja Cement	0.0047	0.0003	better

ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

Table 3 – Comparison of Expected Returns and Actual Returns

Comparison of Expected Returns with Actual Returns				
Sr No.	Stocks	Expected Returns	Actual Returns	Imapct
1	Torrent Pharmaceuticals	0.84%	1.82%	best
2	InterGlobe Aviation (Indigo)	0.92%	1.85%	best
3	Dabur	0.73%	1.37%	best
4	Indus Tower	0.64%	-0.16%	worst
5	Vedanta Ltd	0.44%	0.87%	best
6	ICICI Prudential Life Insurance Comapany	0.77%	0.73%	worst
7	Biocon	0.71%	1.27%	best
8	LTI MindTree	1.25%	4.38%	best
9	Pidilite Industries	0.88%	2.52%	best
10	Ambuja Cement	0.87%	1.78%	best
	nifty 50	0.86%	1.36%	

Expected Returns = CAPM returns

i.e. Rf + ß * (Rm – Rf)

$$\text{Actual Return} = \frac{\text{next price - current price}}{\text{current price}}$$

Table 4 – Computation of valuation of stocks

Sr No.	Security	Beta	Expected Returns	Actual Returns	Difference	Impact	Decision
1	Torrent Pharmaceuticals	0.9303	0.84%	1.82%	-0.98%	overvalued	sell / hold
2	InterGlobe Aviation (Indigo)	1.1499	0.92%	1.85%	-0.93%	overvalued	sell / hold
3	Dabur	0.6315	0.73%	1.37%	-0.64%	overvalued	sell / hold
4	Indus Tower	0.3872	0.64%	-0.16%	0.80%	undervalued	buy
5	Vedanta Ltd	1.1757	0.44%	0.87%	-0.43%	overvalued	sell / hold
6	ICICI Prudential Life Insurance Comapany	0.7393	0.77%	0.73%	0.04%	undervalued	buy
7	Biocon	0.5779	0.71%	1.27%	-0.56%	overvalued	sell / hold
8	LTI MindTree	2.0332	1.25%	4.38%	-3.13%	overvalued	sell / hold
9	Pidilite Industries	1.0317	0.88%	2.52%	-1.64%	overvalued	sell / hold
10	Ambuja Cement	1.0116	0.87%	1.78%	-0.91%	overvalued	sell / hold

Discussion of the results:

- In table 1, the values of Alpha and Beta are calculated of each stock by taking the mean of monthly returns. The intercept and slope formulas are used.
- In table 2, the alpha computed in table 1 is compared with Rf (1-ß) and the performance of the stocks is measured.

  It was found that except for Indus Tower, Vedanta Ltd and ICICI prudential, all the stocks performed better than expected since their Alpha was greater than Rf * (1-ß).

  Indus Tower, Vedanta Ltd and ICICI prudential did not perform well since their Alpha was less than Rf (1-ß).
- In table 3, actual returns were compared with expected returns to identify the best stock. If actual returns are less than expected returns, it can be stated that the stock is worst; otherwise it is best.

  Accordingly, it was found that Indus Tower and ICICI prudential did not perform well since their actual returns were less as compared to the expected returns. On the other hand, since the actual returns were greater than expected returns, it is opined that all other stocks performed well.

ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

- In table 4, actual returns was compared with expected returns to make a judgement of the price of the stock. The rule of thumb states that if the difference between expected returns and actual returns is positive, the stock is adjudged as undervalued and if the difference is negative, the stock is adjudged as overvalued.
  Applying this rule, it was found that only Indus Tower and ICICI prudential are undervalued and so the investor can buy these stocks as they can be bought at lower prices. All other stocks were found to be overvalued and so it is opined that investors can hold or sell the stocks since the prices are high and the profit can be booked by selling these stocks.

Conclusion:

CAPM was applied using two models and the performance of the stock returns were determined. Out of the ten stocks that were selected from the index, 9 stocks gave the same results from both the models, while only Vedanta ltd's impact was found to be contradictory. The Alpha as well as the Actual Returns are higher for 7 stocks (Torrent Pharmaceuticals, InterGlobe Aviation (Indigo), Dabur, Biocon, LTI MindTree, Pidilite Industries and Ambuja Cement). Hence it is concluded that these stocks performed better than the required returns.

Two stocks, i.e Indus Tower and ICICI prudential exhibited lower alpha as well as lower actual returns and so it is concluded that both these stocks did not perform as per the expectations. The stocks are undervalued and investors have a good opportunity to invest in these stocks as the prices are low.

Applying CAPM in both the models, Vedanta ltd showed different results. By Jensen's Alpha, it was analysed that Alpha is less than Rf (1-ß), hence it was opined that the stock did not perform as expected. From model 2, it was found that the actual returns are better than the expected returns. So the stock is overvalued and the investor is suggested to sell the overpriced stock. The investor, depending upon his risk appetite, can also hold the stock.

Since Jensen's Alpha is a superior model, it is adjudged that the Vedanta Ltd's stock has not performed well.

The study will help the investors to get adequate understanding about price behaviour and risk return trade-off of the securities. The study focuses on applying CAPM for comparing the performances of the stock returns in the stock market. The study will enable the investors to take better investment decisions and they will be motivated to invest their surplus in capital markets, and thereby ensuring development of securities market.

References:

Hussain and Islam (2017), "Is the Capital Asset Pricing Model valid in the Indian context?" https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3386440

Ib Fabinu, K. Makinde, A. Folorunso "Empirical analysis of capital assets pricing model (CAPM) as a tool for valuation of a company's returns" Published 24 November 2017, Economics, Business, Journal of business management

Frida Pacho (2014) "Capital Asset Pricing Model (CAPM) Testability and its Validity in Stock Market: Evidence from Previous Literatures" https://core.ac.uk/download/pdf/234630301.pdf

Basu D and Chawla D (2010) "An Empirical Test of CAPM—The Case of Indian Stock Market" journals.sagepub.com

Navya Ninan & Jerush John Joseph (2018), "Assessment of Capital Asset Pricing Model in Indian stock market" https://www.semanticscholar.org

Wahab and Zada (2017), "Testing Short Term and Long Term Applicability of CAPM: A Case of Pakistani Cement Industry" https://scholar.google.com/

Kisman and Restiyanita (2015), "The Validity of Capital

ISSN–2277- 8721

EIIRJ Electronic International Interdisciplinary Research Journal

Volume–XII, Special Issue – II March – April 2023

OPEN ACCESS Original Research Article

Asset Pricing Model (CAPM)" https://www.semanticscholar.org

Philip Gharghori et al (2012), "Validity of the Capital Assets Pricing Model" COREhttps://core.ac.uk

Yash Pal Taneja (2010), "Revisiting Fama French Three-Factor Model in Indian Stock Market" https://journals.sagepub.com › doi

Hasan, Md. Z., Kamal, A. A., Mustafa, A., & Baten, Md. A. (2013), "Testing the Applicability of CAPM in Selected Indian Industries" https://rijbr.in › index.php

Aanchal Singh, "Validity of Capital Asset Pricing Model (Capm)"

Prince Acheampong, Evans Agalega (2013), "Does the Capital Assets Pricing Model (CAPM) Predicts Stock Market Returns in Ghana? Evidence from Selected Stocks on the Ghana Stock Exchange." https://www.semanticscholar.org/paper

Shamim, Abid and Shaikh (2020), "Validity of Capital Asset Pricing Model in Pakistan's Capital Market" https://globalbizresearch.org

Cite This Article:

Dere P., (2023). *Comparison of performance of stock returns in the Indian Stock Market using CAPM,* ***Electronic International Interdisciplinary Research Journal****, XII, Special Issue – II, March - April, 2023, 73-79.*