



Applicability Of Capital Asset Pricing Model OnThe Indian Stock Market (NSE)

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Abstract

Capital Asset Pricing Model (CAPM) is one of the widely used measures of calculating the expected stock return. Investors in National Stock Exchange (NSE) also use it extensively. This study aims to find the applicability of CAPM in NSE and to establish risk and return relationship for individual securities. In this paper it is also tried to find whether the individual securities are overvalued or undervalued using CAPM so as to help the investor to take their buy and sell decision. Closing prices of top 5 different companies on the basis of their market capitalization from 2016 to 2020 have been considered. The basic model developed by William Sharpe (1964) and other authors in different times issued to serve the purpose. The research finds no applicability of CAPM in NSE as the difference between expectations and the actual results is very high at normal risk level.

Keywords— CAPM, Beta, Risk free return, Return on Market, NSE.

Introduction

The functioning of stock broking in India was started in 1875. The BSE is oldest stock broking of India the National Stock Exchange arrives 2nd to the BSE in the terms of status. NSE and BSE represent themselves as the synonyms of the Indian stock market. History of stock market in India is almost same as history of BSE. An up-beat mood of marketplace was lost abruptly with the Harshad Mehta scam. This came to the public knowledge that Harshad Mehta, who is also called as big-bull and giant of Indian stock market which diverted huge fund from banks by fraudulent means. He also played with millions of shares of many companies.

Stock market now also appeals to the middle class Indians. Most of the Indian working in foreign country now diverts their savings to the stocks. This new phenomenon is result of diminished interest rate from banks and opening of the online trading. Stockbrokers based in the India are opening office in different country mainly to cater needs of the Non Resident Indians. They can sell or buy stocks online while returning from work places

National Stock Exchange

The National Stock Exchange of India Ltd. (NSE) is the leading stock exchange in India and the second largest in the world by nos. of trades in equity shares from January to June 2018, according to World Federation of Exchanges (WFE) report. NSE launched electronics screen-based trading in 1994, derivatives trading (in the form of index futures) and internet trading in 2000, which were each the first of its kind in India.

NSE is a pioneer in technology and ensures the reliability and performance of its systems through a culture of innovation and investment in technology. NSE believes that the scale and breadth of its products and services, sustained leadership positions across multiple asset classes in India and globally enable it to be highly reactive to market demands and changes and deliver innovation in both trading and non-trading businesses to provide high-quality data and services to market participants and clients.

Capital Asset Pricing Model

The capital asset pricing model was developed by the financial economist (and later, Nobel laureate in economics) William Sharpe, set out in his 1970 book *Portfolio Theory and Capital Markets*.

Literature Review

Pathak K R (2015): examined the risk return relation of individual securities using the daily data of 50 companies listed on the National Stock Exchange (NSE) which comprise the Nifty Index would be considered for the period



July 2012 to June 2014. CAPM model is used to establish this relation. The study found that other than systematic risk there are various other factors that are affecting the return of securities.

Reddy, & Durga (2015): examined the relationship between risk and expected return of securities. This paper tested the CAPM for the Indian stock market using Black Jensen Scholes methodology. The sample involves 87 stocks included in the Nifty and Nifty Junior indices from 1st Jan 2005 to Aug 2014. The test was based on the time series regressions of excess portfolio return on excess market return. The results show that CAPM partially held in Indian markets over the period of study.

Reddy, & Thomson (2014): examined the capital-asset pricing model (CAPM) for the South African security markets. In this research paper they considered quarterly total returns from 10 sectoral indices listed on the JSE Securities Exchange for the period 30 June 1995 - 30 June 2009. They found, on the assumption of normal distribution of the residuals of the return-generating function, that CAPM could be rejected for certain periods. However, the use of the CAPM for long-term actuarial modeling in the South African market could be reasonably justified.

Galagedera (2014): dealt with individual security returns and examined the risk-return relationship. His multifactor models were virtually extended forms of the Capital Asset Pricing Model (CAPM) with higher order co-moments and asset pricing models conditional on time-varying volatility. He held that an inverse relationship between beta and portfolio returns might be expected, when the market return fell short of risk free return such that the risk premium emerged negative, an inverse relationship between beta and portfolio returns is expected.

Z. A. (2013): examined CAPM model applicability on Central and South-East European emerging security markets using monthly stock returns for nine years for the period of January 2006 to December 2010. The study showed that CAPM is not adequate for accessing the capital assets on observed stock markets. The study showed that higher beta does not mean higher return. The study further concluded that the stock market returns do not lie on the efficient frontier so they do not represent efficient portfolios.

Choudhary, S. C. (2010): examined CAPM for the Indian Stock market using monthly stock returns from companies of BSE 500 index for the period of January 1996 to December 2009. It is found that higher beta is not associated with higher level of returns. The finding of the study contradicts with the hypothesis of CAPM. The study concluded that beta is not sufficient to determine the expected returns of securities Josipa Dzaja.

Taneja (2010): examined the Capital Asset Pricing Model and Fama French Model 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. It is so because a high degree of correlation is found between the size and value factor returns.

Gursoy and Rajepova (2007): studied the validity of CAPM using regression on the weekly risk premium against the beta coefficient of 20 portfolios each including 10 stocks during 1995-2004 of Turkey stock market. In the study it is found that a portfolio of high beta stocks perform better in up market condition, where as a low beta portfolio is a better investment in down market. It also revealed that beta coefficient is indeed an important determinant of portfolio return in Turkey.

Rhaim, Ben, Mabrouk. (2007): focused on the estimation of CAPM at different time scales for French stock market. The empirical results show that the relationship between the return of the stock and its beta becomes



stronger as the scale increase, but the test of the linearity between the two variables shows that there is an important ambiguity.

Ansari (2000): again supported the CAPM and reported that game is not lost for CAPM in the Indian market. Dhankar and Kumar (2007) explained that CAPM helps in explaining the risk return relationship in the Indian market.

Research Gap :

After Examining Previous Related Studies, I Have Found That Those Studies Are Limited To Particular Time Period And Returns And Risk Will Vary According To Time Period Taken.

In My Study I Have Taken The Data Of Previous 5 Years i.e 2016 To 2020 That Are Not Calculated In Previous Studies And I Have Taken The Data Of Different Securities From Different Sectors Which Are Listed In NSE Particularly.

Objectives of the Study

Considering the various studies on CAPM ,the objective of this study is to test the applicability of CAPM in Indian Market. To test, the main objectives is sub divided into further sub objectives:

- To measure the risk of selected securities.
- To measure the rate of return expected by the investors using CAPM model .
- To find whether the selected securities are undervalued or overvalued.

Hypotheses

Ho: There Is No Significance Difference Between Actual Return And CAPM Return.

H1: There Is Significance Different Between Actual Return And CAPM Return.

Research Methodology

To test the applicability of CAPM in the NSE, adjusted half yearly closing prices of top 5 companies have been chosen for the period from January 1, 2016 to July 31, 2020. The daily adjusted closing price of individual stock and Nifty is collected from NSE website. The companies are chosen from the list of 50 companies listed in NSE NIFTY FIFTY. For risk free rate of return the average daily return of government bonds has been used. CAPM formula has been used to know the beta of stocks for stipulated period. For testing the applicability of CAPM in India, first the beta of each stock is calculated for different companies under the different years. Finally the actual return is compared to the expected return calculated using CAPM to find the reliability of return calculated using CAPM.

Data Analysis and Interpretation

The CAPM Formula

CAPM evolved as a way to measure this systematic risk. Sharpe found that the return on an individual stock, or a portfolio of stocks, should equal its cost of capital. The standard formula remains the CAPM, which describes the relationship between risk and expected return.

Here is the formula:

$R_a = R_f + i \cdot (R_m - R_f)$ where:

R_a = Expected return on a security

R_f = Risk-free rate

R_m = Expected return of the market

i = The beta of the security or Systematic risk $(R_m - R_f) = \text{Equity market premium}$



1. Asian Paints

Year	Date	Closing	MarketReturn
2016	JAN 1 ST	878.75	7791.30
	JULY 1 ST	1002.50	8328.35
2017	JAN 1 ST	896.60	8179.50
	JULY 1 ST	1108.55	9615.00
2018	JAN 1 ST	1143.65	10442.20
	JULY 1 ST	1291.85	10657.30
2019	JAN 1 ST	1371.55	10792.50
	JULY 1 ST	133.85	11865.60
2020	JAN 1 ST	1793.20	12182.50
	JULY 1 ST	1688.00	10430.05

SOLUTION:

C.P	Y	MP	X	XY	X2	RiskFree
878.75		7791.3				5.6
1002.5	14.0825	8328.35	6.892945	97.06992	47.51269	
896.6	-10.5636	8179.5	-1.78727	18.87998	3.19433	4.94
1108.55	23.6393	9615	17.54997	414.8691	308.0015	
1143.65	3.166298	10442.2	8.603224	27.24037	74.01547	6.3
1291.85	12.95851	10657.3	2.059911	26.69337	4.243232	
1371.55	6.169447	10792.5	1.268614	7.826647	1.609381	6.49
1353.85	-1.29051	11865.6	9.943016	-12.8316	98.86357	
1793.2	32.4519	12182.5	2.670746	86.67076	7.132883	6.4
1688	-5.86661	10430.05	-14.385	84.39102	206.9276	
SUM=	8.30525		32.81618	750.8096	751.5007	5.888333

$$\text{BETA: } N(\sum xy) - (\sum fx)(\sum fy) / N(\sum x^2) - (\sum x)^2$$

$$= 9(750.81) - (32.81618)(8.3053) / 9(751.5007) - (32.81618)^2$$

$$= 1.14$$

$$\text{MARKET RETURN : } 32.81618/9 = 3.6462$$

$$Ra = Rf + i*(Rm - Rf)$$

$$= 5.9 + 1.14*(3.6462 - 5.9)$$

$$= 3.330716$$

The above table and shows ASIAN PAINTS earned more returns with the highest beta value of 1.14 for the past 5 years and the total return is 92.09 but the CAPM value is 3.3307 and it is undervalued.

The Same Is Calculated For Other 4 Companies

2. AXIS BANK CAPM: 5.607011



The data calculated for AXIS BANK shows it has earned lower returns with the beta value of 0.13 and the return earned is -0.733 but the CAPM shows the return of 5.60 that's why it is overvalued.

3. BAJAJ AUTO

CAPM: 1.68

The result shows that we can say because of its lower beta value i.e 0.02 it have earned less returns 12.896 but also CAPM returns are lower than expected return i.e 12.869 and it is Undervalued.

4. BHARATHI AIRTEL

CAPM: 5.7422

The figures shows that BHARATHI AIRTEL earned at positive rates for the past 5 years with the beta value of 0.07 actual return earned is 87.80 which is more the the calculated value of CAPM and it is undervalued.

5. INFOSYS

CAPM: 4.27

Calculation shows that INFOSYS earned higher returns compared to CAPM with the betavalue of 0.72 and the return earned was 32.43 and it is undervalued.

Findings

1. Through All Data Interpretation And Analysis We Can Say That Returns Of Different Securities Are Fluctuating According To Market Condition.
2. The Returns Of The Securities Directly Depends On The Beta Value Of The Respective Securities.
3. Through observations i found that we may get positive returns if beta value lies between 0 to +1.
4. The results show that stocks return don't depend on the stock beta and the results of CAPM cannot be relied upon.
5. According to CAPM the stock expected rate of return is only affected by its systematic risk, i.e., has no relation with non-systematic risk at all. The findings of the test do not fully confirm this hypothesis.

Suggestions

1. The investor has to invest in the securities with has good market capitalization
2. CAPM held good completely for 10 stocks. So CAPM was not found to be applicable to all the stocks under study.
3. Reliance security is undervalued and it has earned highest returns in past 5 years so i suggest investing in this security.
4. I suggest investors to invest in those securities which have positive beta value and good market capitalization.

Conclusion

The purpose of this research is to test the applicability of CAPM in National Stock Exchange. Closing returns of top 10 companies for 5 years have been considered and it is found that the difference between expectation and actual return is very significant at normal risk level. So, any result may mislead the investors to forecast future movement of stocks. The intensity of differences implies that CAPM has no applicability in NSE.

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