Testing the Applicability of Capital Asset Pricing Model (CAPM) in NSE-India

T.Anusha	**Dr.A.Ananth**
II MBA, Gnanam School of Business, Sengipatti, Thanjavur	Professor, Gnanam School of Business, Sengipatti, Thanjavur

Dr.S.P.S.Aruldoss

Asst.Professor, Gnanam School of Business, Sengipatti, Thanjavur

ABSTRACT Capital asset pricing model (CAPM) is a method used to obtain the relationship between risk and return in efficient market. The study test the applicability of CAPM in Indian stock market, National Stock Exchange (NSE). Thus, the beta value for the twenty companies that are registered on NSE are obtained and calculated. The comparison between the actual and expected return are made. The data analysis revealed limited applicability of CAPM towards the NSE market. Further studies may be conducted on large sample to check the applicability of CAPM.

Introduction:

Capital Asset Pricing Model (CAPM) provide a relationship between risk and return that is existing in efficient. This method has been effectively for making financial decision by various academicians and investors (Harrington, 1993). Even though it is widely used there are still scholar who have made criticism on this method (Hanif, 2009).

There are many scholars and researchers who have made their contribution towards the initial development and improvement of CAPM. This study is regarding with Indian companies that are listed in NSE, covering five years period (2011- 2015). The main aim of this study is to test the validity of CAPM in Indian context, with special reference to NSE.

The methodology used for this study, was to calculate beta (B) value through slope using Microsoft Excel, version 2013 in order to obtain the expected return. The result of this study provide the accuracy of Capital Asset Pricing Model (CAPM) for a small period of time and for few companies only. A total of twenty companies were observed for five years period (2011 – 2015) and out of these results only few companies support the Capital Asset Pricing Model (CAPM). This shows that the CAPM is not valid in Indian institutions. The result was also similar to the suggestions given by Eatzaz&Attiya (2008) and Hanif (2009) in Pakistani context, Groenwold& Fraser (1997) Australia, Hui & Christopher (2008) Japan & USA, Quo &Perron (2005) United States.

Literature Review:

In current scenario, the investors expect for high return for their investment even though it involves a greater risk. To analyze the risk behind their investment the investors use different model for their calculations. The most widely used method by investors and managers is CAPM (Jagannathan& Wang, 1993).

It is stated that CAPM too has some assumptions (Van Horne, 2006). Whenever there is more risk involved then there will be a higher return. There are two types of risk such as systematic risk and unsystematic risk. The unsystematic risk can be controlled whereas systematic risk are only compensated by the investors (Lan& Quay, 1974).

The usage of beta has been increased, after the enhancement of CAPM especially by the investors. The CAPM, uses beta for calculating the risk and to determine the expected return (O'Brien & Srivastava, 1955). Beta facilitate us to determine the fluctuation in price of the share and also enable us to find out the relative movement of share portfolio to the market portfolio (Jones, 1998).CAPM specifies that there is a linear relationship between the systematic risks obtained by beta and the return that is expected. This relationship describes the Security Market Line (SML), this has been stated by Blume (1993).

The validity of CAPM on different context was undergone by many researchers. In Swedish stock market the result obtained was different from international evidence regarding CAPM (Bjarn&Hordahl, 1998). Similarly, the model was applied to Tokyo stock market by Lau & Quay, 1974 and the result support CAPM. The validity of CAPM was also brought to test in S&P 500 index by Gomez &Zapatro (2003), the two beta model was adapted which supported the model. The result of Bossaert et al (1999), did supported the CAPM but later discarded the model due to the time constraints.

In Johannesburg stock exchange context by Bradfield, Barr & Affleck- Graves study supported the model & declared it to be useful. Arbitrage Pricing Theory (APT) proposed by Ross (1976) says that all factors that affect the returns are not considered in CAPM, this made them to develop the multi-factor model but still only CAPM model is widely used to analyze the risk and return.
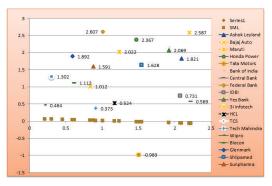
The Capital Asset Pricing Model (CAPM) was tested in US & Japan at same time where result was against the CAPM to provide an analysis on risk and return (Hui & Christopher, 2008). To test the validity of CAPM in Karachi stock exchange (KSE) by Mohammad Ibrahim Khan (2012) focused on beta calculation. The result revealed the limited applicability of CAPM. Similarly, in Greek stock market, Grigores&Strahhgvos (2006), the result of their study didn't support the concept of high risk and high return.

Research Methodology:

The study is about the validity of CAPM (i.e.) whether CAPM provides valid, precise and correct results. When taken into account for study involving the NSE-India, and does it prove to be helpful to the investors to make their decision on investment. This study has primarily focused on the calculation of Beta of twenty different companies for finding the expected return and then by comparing it to the actual return, for testing the CAPM for its validity. The NSE website proved very efficient, as it provided with the list of companies and its symbols. It also helped in providing the secondary data for the analysis. The sample taken for this study is not covering all the companies listed at NSE, as only twenty (20) companies have been considered for this study and the data collected for the past five years from 2011 to 2015.

Analysis: Table No: 01

Company Name	Average Return	Beta	Expected Return	Difference	Result	Decision
Ashok Leyland	1.821	2.096	-0.0649344	1.885934	Underpriced	Buy or Hold
Bajaj Auto	1.012	0.835	0.0156435	0.996357	Underpriced	Buy or Hold
Maruti	2.022	1.238	-0.0101082	2.032108	Underpriced	Buy or Hold
Company Name	Average Return	Beta	Expected Return	Difference	Result	Decision
Honda Power	2.367	1.478	-0.0254442	2.392444	Underpriced	Buy or Hold
Tata Motors	-0.983	1.504	-0.0271056	-0.95589	Overpriced	Sell
Bank of India	2.162	1.923	-0.0538797	2.21588	Underpriced	Buy or Hold
Central Bank	0.569	2.223	-0.0730497	0.64205	Underpriced	Buy or Hold
Federal Bank	2.607	1.011	0.0043971	2.602603	Underpriced	Buy or Hold
IDBI	0.731	2.081	-0.0639759	0.794976	Underpriced	Buy or Hold
Yes Bank	2.069	1.923	-0.0538797	2.12288	Underpriced	Buy or Hold
3i Infotech	2.587	2.204	-0.0718356	2.658836	Underpriced	Buy or Hold
HCL	0.524	1.174	-0.0060186	0.530019	Underpriced	Buy or Hold
TCS	1.302	0.303	0.0496383	1.252362	Underpriced	Buy or Hold
Tech Mahindra	0.373	0.911	0.0107871	0.362213	Underpriced	Buy or Hold
Wipro	0.464	0.213	0.0553893	0.408611	Underpriced	Buy or Hold
Biocon	0.589	0.457	0.0397977	0.549202	Underpriced	Buy or Hold
Cipla	1.113	0.618	0.0295098	1.08349	Underpriced	Buy or Hold
Glenmark	1.892	0.593	0.0311073	1.860893	Underpriced	Buy or Hold
Shlipamed	1.628	1.55	-0.030045	1.658045	Underpriced	Buy or Hold
Sunpharma	1.591	0.881	0.0127041	1.578296	Underpriced	Buy or Hold
BRITTANIA	2.28	0.49	0.038	2.242	Underpriced	Buy or Hold
HUL	1.298	0.31	0.049	1.249	Underpriced	Buy or Hold
DABUR	1.16	0.30	0.050	1.110	Underpriced	Buy or Hold
GODREJ	1.33	0.43	0.042	1.288	Underpriced	Buy or Hold
MARICCO	1.35	0.55	0.034	1.316	Underpriced	Buy or Hold
EMAMI LTD	1.44	0.63	0.029	1.411	Underpriced	Buy or Hold
Company Name	Average Return	Beta	Expected Return	Difference	Result	Decision
JUBLIANT	1.35	0.72	0.023	1.327	Underpriced	Buy or Hold
ITC	0.77	0.44	0.041	0.729	Underpriced	Buy or Hold
BPCL	1.32	1.27	-0.012	1.337	Underpriced	Buy or Hold
MCDOWELL	1.63	1.67	-0.038	1.668	Underpriced	Buy or Hold
CAIRN	1.15	1.36	-0.018	1.168	Underpriced	Buy or Hold
NTPC	0.46	0.75	0.021	0.442	Underpriced	Buy or Hold
HIND PETRO	0.45	0.78	0.019	0.431	Underpriced	Buy or Hold
TATA GLOBAL	0.57	1.29	-0.013	0.583	Underpriced	Buy or Hold
GAIL	0.43	1	0.005	0.425	Underpriced	Buy or Hold
POWER GRID	0.20	1.03	0.003	0.199	Underpriced	Buy or Hold
IOC	0.01	0.92	0.010	0.000	Underpriced	Buy or Hold
RIL	-0.04	1.49	-0.026	-0.012	Overpriced	Sell
TATA POWER	-0.03	1.04	0.003	-0.028	Overpriced	Sell
ONGC	-0.07	0.79	0.019	-0.084	Overpriced	Sell
Nifty 50	**0.0051**					
Risk Free	**6.90%**					

The data analysis tool, used for this study is the MS excel (2013). The formula used for finding out the required rate of return is given as;

$Rj = Rf + \beta(Rm - Rf)$
Where
Rj= Required rate of return on security j
Rf= Risk free rate of return

β = Beta of the security (measure of systematic risk)
Rm = Average return on market portfolio.

The stock price or the share prices of the companies, considered for this study, have been taken from the website of NSE. The closing price of stock or share of the companies, considered for this study, have been taken from the website of NSE. Then the return was calculated by taking the current closing prices, subtracting the closing price from the opening price and dividing it by the opening price. Similarly, the formula was applied to the market index, for calculating the returns on market portfolio. Beta was calculated by applying slope function in excel, considered Y = stock return and X = market return for all the stock. Finally the above said formula applied for finding out CAPM return and the plot SML line in chart. Based on the chart the stocks were identified as overvalued and undervalued and then decision has also been taken.

Conclusion:
The basic objective of this study was to test the validity of Capital Asset Pricing Method (CAPM) in NSE (National Stock Exchange) in India. The analysis of twenty companies listed on NSE for the period of five years (2011 – 2015) revealed that the CAPM does not provide an accurate result. Though, very slight

evidence was seen these findings help in concluding that CAPM is not applicable to NSE – India. Even though evidences has been put forward against the use of CAPM, still it is used as a tool for finding out the cost of capital, investment performance evaluation and studies of efficient market events (Campbell et al, 1997).

Thus Capital Asset Pricing Method (CAPM) is not an effective tool to measure risk and return and therefore investors must not depend on it to make their decisions.

The studies must also be made on other models such as APT (Arbitrary Pricing Theory), considering the multiple factors that affect risk and return. Comparisons must also be made between these model for the better understanding of risk and return relationship and pricing mechanisms.

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