

Empirical Testing of Capital Asset Pricing Model : A Study of Selected Securities in India

Dr. Megha Jain

Faculty, Economics and International Business, Jaipuria Institute of Management, Indore

Ms. Neha Sahu

Assistant Professor, IPS Academy, Institute of Business Management & Research, Indore

ABSTRACT

Individual securities have different degree of risks. There is always a high risk associated with corporate bonds and shares when it comes to default as well as there is a high variability of returns. If we compare shares with that of bonds, the former is generally found to be riskier. For risky securities, investors require higher rate of return. As per Capital Asset Pricing Model, the expected rate of return on a security is equal to risk free rate plus risk premium. There comes a direct relation generally between risk premium and systematic risk which is measured by beta. This study is an attempt to evaluate the performance of the selected stocks and find whether the securities are overvalued or undervalued based on Capital Asset Pricing Model. The study reveals that Reliance Capital Ltd, ICICI Bank Ltd are overvalued whereas the stock price of Axis Bank Ltd & Yes Bank Ltd are undervalued.

Keywords: Risk, Return, Beta, Valuation, Risk Premium.

INTRODUCTION

A lot many studies have been happening and many finance experts, statisticians and economists have tried and developed models to predict the stock price movements in capital markets. Many tools and techniques have been utilized in this endeavor to identify the most contemporary investment management models so that one can very well predict the market and strive to outperform in even high volatilities.

The stock markets have become an attractive destination than ever before specially in the light when the market is well regulated. This has also improved scope for better valuation of securities.

The increased safety and transparency in the stock market has helped in materializing better gains from the market, relatively less affected by erratic market movements.

The major difference between government bond or treasury bills and corporate bonds or shares is the degree of risks associated. While on one hand, the risk of variability or default is close to zero in case of the former, it is at varied degrees when it comes to an individual company's shares or even corporate bonds, even the risks of default also are more in the case of latter.

While for a non – risky investment, customers expect compensation only for time, they look at high returns for risky securities.

Indian stock market also is characterized with high degree of volatility and variability of returns. This paper attempts to capture the same i.e if the Capital Asset Pricing Model (CAPM) holds and is able to predict the returns or is able to guide for risk premium in Indian Stock Market.

The CAPM model states that keeping other things constant, the expected return on any security should be equal to a market risk free rate plus a risk premium, which can be expressed as follows:

$$\text{Expected Return} = \text{Risk free rate} + \text{Risk Premium}$$

Risk premium equals to the difference between the expected market return and the risk free rate multiplied by the security's beta. The risk premium varies directly with systematic risk measured by beta.

Model

Under the CAPM, the market rewards for the systematic risk only which is measured by the Beta co-efficient. It states that there is a linear relationship between the expected return on individual stock and beta. This relationship is measured as:

$$R_i = R_f + \beta [E(R_m) - R_f]$$

Where,

R_i = Expected return on the security;

R_f = Risk free return;

R_m = Expected return on market portfolio;

β = Systematic rate of asset.

The relationship which is defined between systematic risk and return is represented by Security Market Line i.e. SML and it guides if the expected returns for the individual assets or portfolio of assets is efficient. The expected returns on different assets shall vary as there shall be difference in their betas. It is generally observed that there is a linear relationship between beta and expected return of any asset i.e. if beta is more for any security, then one must expect a higher return and vice-versa.

The CAPM model since long has weathered the test of times in different stock markets and is found successful many a times in measuring the risk and return of an investment. The model not only provides for both a quantitative as well as logical approach for estimation of risk and return in the given business environment. And helps in identifying whether a stock is overvalued or undervalued.

LITERATURE SURVEY

CAPM Model since its introduction has been a favorite area of research in the field of economics and finance. It's first ever model was proposed in 1961, 62 (Treynor, 1961, 1962) (Sharpe, 1964).

It has been a practice since then that investors and finance managers willing to invest in securities preferably justify their decisions on the basis of CAPM. The model helps providing the method to calculate the return that the investors demand. The studies made by Black, Jensen and Scholes (1972) is one amongst the classic examples of an empirical testing of this model.

Black et.al. instead of using individual stocks, selected portfolios and considered their monthly return for their studies. They made a cross-sectional study to find whether the expected returns are linear (i.e. the slope beta is linear). Instead of selecting individual securities, they diversified most of the firm specific components of returns by considering portfolios as this helped in improving the precision of the beta estimates as well as expected rate of returns of the portfolio securities.

Fama and McBeth (1973) also investigated if the relationship is linear between and positive between average returns and beta. They also tested if the volatility of asset returns and squared value of beta could explain the residual variation in average returns across assets that are otherwise not explained by beta alone. Several other studies were conducted after that in 1980s which also indicated a lot of deviations from the traditional linear CAPM risk-return model as many other variables also come into play to affect this trade off. These studies targeted to find and identify those other variables that created the deviations and because of which traditional CAPM was unable to explain the risk-return trade off.

In this direction, Basu (1977) in particular studied the impact of earnings yield, ratio of firm's book value of equity to its market value and leverage. Banz (1981) on the other hand concluded through his studies that the deviations though were observed as suggested by data but they are not sufficient and important enough to reject the base theory. Banz also found while comparing the average returns on stocks of small with that of large firms, wherein the small firms mean the ones with low market value of equity; the returns were higher in case of the former.

RESEARCH OBJECTIVES

- To evaluate the performance of the select stocks using CAPM model.
- To measure the systematic risk of select securities by using beta.
- To calculate the rate of return expected by investors on the select securities.
- To find whether the securities are overvalued or undervalued in the market.

SAMPLING DESIGN

The sample size taken for conducting research is four companies from financial services sector. The sample is screened to include only those scripts which have been quoted at least in 60 months during the entire 5 years period of the study. The selected companies are:

- Reliance Capital Ltd.
- ICICI bank Ltd.
- Yes Bank Ltd.
- Axis Bank Ltd.

The research was confined to analyze the performance of selected securities in comparison with the stock market performance (BSE).

DATA COLLECTION

For the purpose of study, data was collected from secondary resources. The data was taken from Bombay Stock Exchange of India (BSE here after). For the study, the adjusted closing price of selected securities for the study period 2012 to 2016 were considered.

Tools and Parameters used for Analysis

Mean (Geometric Mean), Beta, Index Returns (BSE), Securities Returns and Risk free rate of return.

Data Analysis and Interpretation:

Table 1 : Calculation of Return

Year	Market Return	Reliance Capital Ltd.	ICICI Bank Ltd.	Yes Bank Ltd.	Axis Bank Ltd.
2012	0.312	0.928	0.583	0.756	0.596
2013	0.033	-0.209	0.040	-0.054	0.080
2014	0.370	0.473	0.523	0.871	0.727
2015	-0.008	-0.064	-0.287	-0.032	-0.081
2016	0.038	0.060	0.039	0.525	0.046
Mean Return (%) (Geometric Mean)	13.81	17.37	13.19	35.64	23.41
Beta	1	2.31	1.77	2.07	1.93

Source: Author's Calculation

In practice, it is found that arithmetic average is considered for the purpose of evaluation of returns as this is the maximum average which could be taken. But if there is volatility in returns, taking arithmetic averages can be inaccurate. Since the returns are generally highly volatile and can be compounded, this therefore becomes a cause of inaccuracy. It becomes imperative therefore, to make the necessary adjustments according to the concept of volatility in order to improve returns. Geometric mean, therefore is used to consider the investment returns and account for volatility thereby improving the investment profits.

The equity risk premium expected by equity investors to take an additional risk is determined by the beta.

It has been observed from the Table-1 that the stock of Reliance capital Ltd has highest Beta which can be understood that risk and return in this security is higher which can be similarly interpret for the stock of Yes Bank .The lowest Beta among the four is of ICICI, which shows the volatility of this script is comparatively low in comparison to rest securities considered for analysis .

Table 2 : Calculation of Expected Return through CAPM

$$\text{Equation } R_i = R_f + \beta [E(R_m) - R_f]$$

CAPM	Reliance Capital Ltd.	ICICI Bank Ltd.	Yes Bank Ltd.	Axis Bank Ltd.
[E (R _m)-R _f]	7.54	7.54	7.54	7.54
β [E (R _m) - R _f]	17.42	13.35	15.61	14.55
R _f + β [E (R _m) - R _f]	23.69	19.62	21.88	20.82

Note: R_f (Risk Free Rate) is considered as 6.27%

Source: Author's Calculation

Table 3 : Evaluation of the Securities

Securities	Securities Return	Expected Return	Inference
Reliance Capital Ltd.	17.37	23.69	Over Value
ICICI Bank Ltd.	13.19	19.62	Over Value
Yes Bank Ltd.	35.64	21.88	Under Value
Axis Bank Ltd.	23.41	20.82	Under Value

Source: Author's Calculation

As per the above results it is clear that Yes Bank & Axis Bank stocks are undervalued, therefore, it is not good for the investors to buy the stock whereas ICICI Bank, Reliance Capital stocks are overvalued, the investors can buy the stocks and give first preference to Reliance capital because it gives more return than expected (as per CAPM).

CONCLUSION

The results imply that CAPM model holds in Indian stock markets as well, explaining to a great extent the behavior of selected stock returns. The assumption that in general high (low) returns are linked with high (low) risks could not be completely supported by the empirical test results in the present study.

According to calculated Beta values, all the four securities have beta values more than 1, therefore they shall be considered as Aggressive Stocks, that is they are expected to outperform the rate of growth of market when we compare their individual returns vis-à-vis overall stock market returns.

Though the CAPM is considered as one the good estimator that also describes the stock return well in the Indian context but this cannot be considered as sufficient for investment decisions. Apart from this, investors should take their investment decisions considering other factors as well such as EPS of the stock under consideration, P/E ratio, dividends distributed, bonus and right issues, to name a few.

Also, a lot many cases have been found where companies enter into ill practice of manipulating financial estimates by altering financial statements like Balance sheet, P&L accounts, which makes it real difficult to assess the fair position of a company financially. Therefore, investments made merely on above factors also may not provide a correct estimation of sock returns. Thus, investors should take extra precautions while estimating stock returns in order to invest in the individual securities or even when they plan for a portfolio of securities while making investment decisions.

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