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A critical study of capital asset pricing model

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Abstract
CAPM is widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios. It offers powerful predictions about how to measure risk and the relation between expected return and risk. It also point out some of the assumptions underlying the CAPM which must be satisfied if it is to be used for calculating expected return from securities of equivalent risk. This paper critically examines the advantages and disadvantages of this model. The data for this study has been taken from secondary sources, such as books and websites. This paper concluded that this model is highly useful in prediction of risk and return relationship of securities.

Keywords: Capital market, CAPM, portfolio, risk and return relationship

Introduction
In finance, the capital asset pricing model (CAPM) is used to determine a theoretically appropriate required rate of return of an asset, if that asset is to be added to an already well-diversified portfolio, given that assets non-diversifiable risk. The model considers the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), often represented by the quantity beta (β) in the financial industry, as well as the expected return of the market and the expected return of a theoretical risk-free asset. CAPM "suggests that an investor's cost of equity capital is determined by beta.

The CAPM was introduced by Jack Treynor (1961, 1962) [7], William F. Sharpe (1964) [8], John Lintner (1965) [9]. Despite its empirical flaws and the existence of more modern approaches to asset pricing and portfolio selection (such as arbitrage pricing theory and Merton's portfolio problem), the CAPM still remains popular due to its simplicity and utility in a variety of situations. According to CAPM every investment carries two types of risk one is the risk due to the market, which is called as systematic risk. The other unsystematic risk is specific to a company's fortunes. Since this risk can be eliminated by diversification. As a result, investors are interested in systematic risk when they search for efficient portfolios. The capital asset pricing theory helps the investors to understand the risk and return relationship of the securities. It also explains how assets should be priced in the capital market.

Review of Literature
Galagedera (1972) [2] concluded that for the CAPM to hold, normality of returns is crucial assumption, and if the CAPM holds, then only the beta should be priced. Several studies have shown that security returns are non-normal and this is evident especially in high frequency data. When returns are normal, the mean and the variance are sufficient to describe the return distribution.

Galagedera and Silvapulle (2002) [3], found that the relationship between the returns and higher-order systematic co-moments in the up and down markets. It was found that there is a strong empirical evidence to suggest that in the presence of skewness in the market returns distribution, the expected excess rate of return is related not only to Beta but also to systematic co-skewness.

Choudhary (2010) [1] tested the validity of the CAPM for the Indian stock market. It was found that beta is not sufficient to determine the expected returns on the securities and portfolios. The empirical findings of this study would be useful to financial analysts in Indian capital market. Further research on the combinations of market factors, macroeconomic factors and firm's specific factors can be carried out to solve the CAPM puzzle.

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Objectives of the Study
1. To understand the concept of CAPM.
2. To critically examine the advantages and disadvantages of CAPM.

Research Methodology
Research methodology is partly descriptive and analytical in nature. The data has been gathered through secondary sources such as books, web sites, published and unpublished material.

Capital Asset Pricing Theory
Markowitz, William Sharpe, John Linter and Jan Mossin provided the basic structure for the CAPM model. It is a model of linear general equilibrium return. In the CAPM theory, the required rate of return of an asset is showing a linear relationship with asset's beta value.

Assumptions
1. an individual seller or buyer cannot affect the price of a stock.
2. Investors make their decisions only on the basis of the expected returns, standard deviations and covariance's of all pairs of securities.
3. Investors are free to borrow or lend at risk free rate of interest.
4. Assets are infinitely divisible.
5. There is no transaction cost.
6. There is no personal income tax.
7. Investors have homogenous expectations.

The concept
According to CAPM, all investors hold only the market portfolio and riskless securities. The market portfolio is a portfolio comprised of all the stocks in the market. Each asset is held in proportion to its market value of all risky assets.
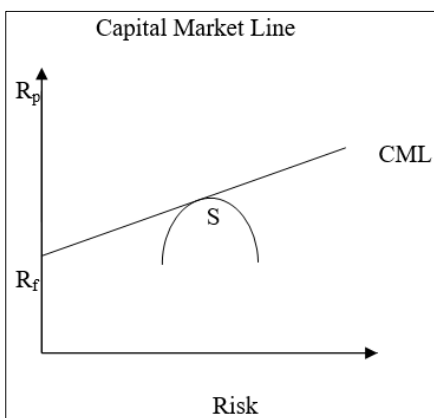
Capital market line
The RS line represents all possible combination of riskless and risky asset. The 'S' portfolio does not represent any riskless asset but the line RS gives combination of both. The portfolio along the path RS is called lending portfolio that is some money is invested in the riskless asset or may be deposited in the bank for a fixed rate of interest. If it crosses the point S, it becomes borrowing portfolio. Money is borrowed and invested in the risky asset. The straight line is called the CML. This line gives the desirable set of investment opportunities between the risk free and risky investments. The CML represents linear relationship

between the required rates of returns for efficient portfolios and their standard deviations. For a portfolio on the CML, the expected rate of return in excess of the risk free rate is the proportion to the standard deviation of the market portfolio.

Formula is:

$$E\,(R_p) = \frac{R_f + (R_m - R_f)}{\sigma_m} \times \sigma_p$$

$E\,(R_P)$ = portfolio's expected rate of return
R_m = expected return on market portfolio
σ_m = standard deviation of market portfolio
σ_p = standard deviation of the portfolio

Security market line
The SML helps to determine the expected return or a given beta of individual securities and portfolios whether efficient or inefficient. In other words, when betas are given, we can generate expected returns for the given securities. The securities whose beta value is greater than 1 are said to be aggressive securities. When beta values are less than 1, they are known as defensive securities.
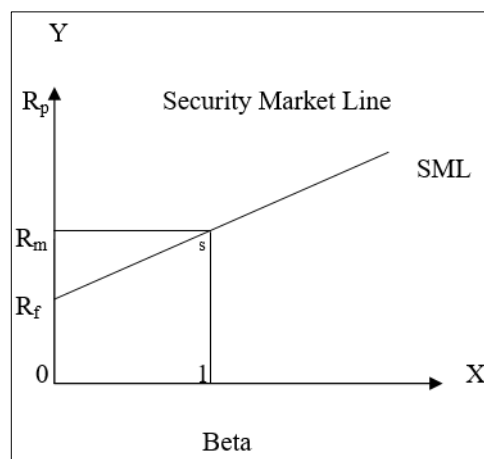
Formula is: $E\,(R_i) = R_i + \beta_i\,[E\,(R_m) - R_f]$
β_i = Systematic risk of securities

Evaluation of Securities
Relative attractiveness of the securities can be found with the help of securities market line. A stock with high risk factor is expected to yield more return and vice-versa. But the investor would be interested in knowing whether the security is offering return more or less proportional to its risk. The stocks above the SML yield higher returns for the same level of risk. They are underpriced compared to their beta value.

Formula is:

$$R_i = \frac{P_i - P_o + Div}{P_0}$$

P_i = Present price
P_o = Purchase price
Div = Dividend

When the purchase price is low, the expected return could be high. When the purchase price is high, the expected return could be low.

The securities which are on SML are considered to be appropriately valued. They offer returns in proportion to their risk. They have average stock performance, since they are neither undervalued nor overvalued.

Advantages of CAPM

This model is greatly appealing at an intellectual level, logical and rational. The basic assumptions on which the model is built raise, some doubts in the minds of the investors. Yet investment analysts have been more creative in adapting CAPM for their uses.

1. The CAPM focuses on the market risk, makes the investors to think about the riskiness of the assets in general. CAPM provides basic concepts which are truly of fundamental value.
2. The CAPM has been useful in the selection of securities and portfolios. Securities with higher returns are considered to be underpriced and attractive to buy. The below normal expected return yielding securities are considered to be overvalued and suitable for sale.
3. In this model, it has been assumed that investors consider only the market risk. Given the estimate of risk free rate, the beta of the firm, stock and the required market rate of return, one can find out the expected returns for a firm's security. This expected return can be used as an estimate of the cost of retained earnings.

Disadvantages of CAPM

1. The betas of individual stocks are unstable; hence the past betas for the individual securities are not good estimators of future risk.
2. The bats of portfolios of ten or more randomly selected stocks are reasonably stable, hence the past portfolio bats are good estimators of future portfolio volatility.
3. The studies generally showed a significant positive relationship between the expected return and the systematic risk. But the slope of the relationship is usually less than that of predicted by the CAPM.
4. The risk and return relationship appears to be linear. But empirical studies give no evidence of this relationship.
5. This model implies that unsystematic risk is not relevant, but both risks are positively related to security returns.
6. If the CAPM were completely valid, it should apply to all financial assets including bonds. But, when bonds are introduced into the analysis, they do not fall on the SML.

Conclusion

All of the discussion and in spite of the limitations outline above, CAPM is useful for the investors to understand the risk and return relationship of the securities. It also explains how assets should be priced in the capital market. The market portfolio is well defined in this conceptually. The well-defined market portfolio is a significant advantage of the CAPM leading to the wide usage of the model in the stock market.

References

1. Choudhary, Kapil. Testing Capital Asset Pricing Model: Empirical evidences from Indian capital market, Eurasian Journal of Business and Economics. 2010;3(6):127-138.
2. Galagedera DUA. A Review of Capital Asset Pricing Model, dept of econometrics and business statistics; c1972.
3. Galagedera DUA, Silvapulle P. Conditional relation between higher-order co-moments and stock return: Evidence from Australian data, proceedings of the econometrics society Australian meeting; c2002.
4. Pandian P. Security Analysis and Portfolio Management, 2nd edition, Vikas publishing house PVT LTD, New Delhi; c2009.
5. www.wikipedia.com
6. www.google.com
7. Treynor JL. Market value, time, and risk. Time, and Risk (August 8, 1961). 1961 Aug 8.
8. Sharpe WF. Capital asset prices: A theory of market equilibrium under conditions of risk. The journal of finance. 1964 Sep;19(3):425-42.
9. Lintner J. Security prices, risk, and maximal gains from diversification. The journal of finance. 1965 Dec 1;20(4):587-615.