## Conceptual Framework of CAPM Model & Economic Value Added

### Chapter 2

**CONCEPTUAL FRAMEWORK OF CAPM MODEL & ECONOMIC VALUE ADDED**

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2.1 INTRODUCTION

Financial management emerged as a separate field of study in the early 1900’s. The role of financial management is limited to fund raising and administering needed by the corporate enterprises to meet their financial needs. Enterprise requires funds for certain episodic events like merger, formation of new firms, reorganization, and liquidation and so on. The scope of the financial management in tradition approach was in the narrow sense. Tradition approach to the scope of financial management evolved during 1920’s and continued to forties and through the early fifties. But criticism was started on this approach in the later fifties due to,

1) The traditional approach concerned only raising, acquiring, and administering funds for episodic events.
2) This approach was outsider-looking-in approach, and ignores insider-looking-out approach.
3) The approach was given over emphasis on long term financing, it ignores working capital finance.
4) This approach concerned with procurement of funds from the outside. It didn’t consider the function of allocation of capital.

Due to above discussed limitation modern approach was started during mid 1950’s. Its scope is wider since it covers both procurements of fund as well as their allocation. Allocation is not just haphazard allocation; it is efficient allocation among various investments, which will maximize shareholder’s wealth.

Shareholder’s wealth can be maximizing by various ways, among them one is security prices that is expected by investors. Two key determinants of share/security prices are expected risk and return. The financial managers must understand these concepts as they have a bearing on the share prices as well as the valuation of the firm. Now a day’s every corporate sector units argued that they can maximize shareholder’s wealth. But due to recent trend of FII and domestic investments, investor needs to evaluate the performance of the company.
Though for the performance evaluation, many different types of methods are there i.e., Earning Per Share, Return on Capital Employed, Return on Net worth, Net profit Margin etc. But EVA is one of the modern techniques for performance measurement of corporate unit. EVA focuses on clear surplus in contradiction to the traditionally used profit available to the shareholder.

2.2 MEANING OF ECONOMIC VALUE ADDED

In modern competitive world each & every corporate unit has been able to earn profit. Just earning profit is not enough, a corporate unit should earn sufficient profit to cover its cost of capital and create surplus to grow. Though, traditionally there are lots of method for measuring performance evaluation of corporate units i.e. EPS, ROCE, RONW, Net Profit Margin, ROI, Ratio Analysis etc.

However, the traditionally used profit indicators are ineffective parameters in explaining whether the reported profit covers the cost of capital or not. Furthermore investors would like to earn risk free return plus return on their risk. Now a day’s company distribute dividend to their shareholders, but Profits after taxation, less dividends paid out to the shareholders, are funds that belong to the equity shareholders which have been reinvested in the company and therefore, those retained funds should be included in the category of equity. Real owner of such reinvested capital is equity shareholders and they expect certain percentage return on such capital employed. This is known as Economic Value Added.

2.3 HISTORY & EVOLUTION OF EVA

The term ‘Economic Value Added (EVA)’ is a registered trademark of Stern Stewart & Co. of New York City (USA). Bennett Stewart in his book, “The Quest for Value”, used the term EVA with a symbol ™ as super script, which is the normal practice of referring to any registered trademark whenever the term is used. Thus EVA is actually Stern Stewart & Co.’s trademark for a specific method of calculating economic profit. “The Quest for Value” was published in 1991. Peter Drucker claimed that he discussed EVA in 1964 in his book, “Managing for Results”. It cannot be denied; however, without going into argument as to who
invented EVA first that the concept became popular only after Stern Stewart & Co. marketed it. Afterward there are lots of study has been taken place related to EVA.

Easton, P. Harris, T. and Ohlson, J (1992) observed that Economic Value Added (EVA) is an increasingly popular corporate performance measure one that is often used by companies not only for evaluating performance, but also as a basis for determining incentive pay. Like other performance measures, EVA attempts to cope with the basic tension that exists between the need to come up with a performance measure that is highly co-related with shareholders wealth, but at the same time somewhat less subject to the random fluctuations in stock prices. This is a difficult tension to resolve and it explains the relatively low correlation of all accounting based performance measures with stock returns at least on a year to year basis.

Stewart, G. Bennet (1994) explained that adoption of EVA system by more and more companies throughout the world clearly proves that it provides an integrated decision-making framework, can reforms energies and redirect resources to create sustainable value for companies, customers, employees, shareholders and for managements.

Blair, A. (1997) concluded that EVA has generated much interest in the business community. This financial tool advocates debt finance as evidenced by its basic formula, which uses the weighted cost as the cost of capital, thus becomes cheaper than equity, partly due to the tax deductible interest.

Muthumeenakshi M. & Amilan S. (2008) studied 30 company’s relationship between EVA and equity return. They seeks from the study that there is negative relationship between EVA and equity return has been found during the study period. V.Anandavel & Dr.A.Selvarasu. (2012) study concludes that among the 30 companies ONGC and reliance industries EVA were topped. Furthermore study also reveals that among 30 Companies 3 Company’s EVA was negative during the period of the study. So the companies should improve their profit which is enough to face their cost of capital. Furthermore study reveals that a majority of the companies
are still not prepared to employ the EVA technique to evaluate their financial performance because of certain inherent difficulties associated with the computation.

2.4 EVA AS A PERFORMANCE MEASUREMENT TOOL IN CORPORATE WORLD

- The simplicity of EVA in communicating the very fundamental principle that only the generation of surplus over cost of capital can enhance shareholders wealth makes it a management technique superior to other planning and control techniques.

- Unlike conventional profitability measures EVA helps the management and also other employees to understand the cost of equity capital.

- Business unit managers often seem to think that they have the right to invest all the retained earnings that their business unit has accumulated although the group would have better investment opportunities elsewhere. EVA might change the aptitude in this sense because it emphasizes the requirement to earn sufficient return on all capital employed.

- At best EVA can be a new approach to view business. Perhaps the biggest benefit of this approach is to get the employees and managers to think and act like shareholders. It emphasizes that in order to justify investments in the long run they have to produce at least a return that covers the cost of capital.

- It is corporate surplus that should be shared by the employees, management and shareholders. Emergence of the idea of sweat equity in Indian context needs a supportive value sharing concept which EVA can answer better than any other traditional profit parameters. Efficiency bonus, profit sharing schemes, managerial remuneration over and above a minimum sustenance salary, issue of bonus shares to the equity shareholders and incentive dividend to the preference shareholders can be better linked to EVA.
2.5 ASSUMPTIONS UNDER EVA

Though Stern Stewart & Co. gives almost 164 adjustments for the calculation of realistic EVA. But in the present study following adjustment has made for the proposed study.

1) Risk Free Return: Researcher have assumed that the RBI government bond yield is risk free rate of return and 5 year’s Government bond yield is collected from the website of RBI. Researcher have assumed that average bond yield of five year is taken as risk free rate of return which is shown in chapter no. 4.

2) Market Premium: Researcher have assumed that the return on Market Index as market premium and 5 year’s daily BSE Sensex data has been collected from the website of BSE. For that purpose annual return on BSE Sensex has been calculated. It was assume that average return on market index is taken as market premium which is shown in the chapter no. 4.

3) Risk coefficient: Researcher has taken BSE Sensex & each company’s stock price to compute beta value of BSE – 30 Companies as risk coefficient. For that purpose daily BSE Sensex & stock price data has been collected from the authenticated database capitaline.com.

2.6 ADVANTAGES OF EVA

- EVA captures the performance status of corporate system over a broader camas.
- To be manage to cost of capital with the return of capital & particularly which project having less investment transfer to another one.
- EVA is most directly linked to the creation of shareholders wealth over time the term maximizing value in long term yield on shareholder’s investment & not just the absolute amount of earning profit.
- EVA compensation systemization managements interest with those of shareholders.
To reduce unproductive expenses which are not productive?
New investment having high return in compare to cost.
EVA framework provider a clear perception of underlying economics of a business & enable managers to make better decision.
EVA is used to access the likely impact of competing strategies on shareholder’s wealth & thus helps the mgt to select the one that will best serve shareholders.
A regular monitoring of EVA emphasizes on problem areas of a company & helps managers to take corrective action.

2.7 LIMITATIONS OF EVA

EVA does not take into consideration the cash flows. The company can increase EVA in long run. Therefore increase in EVA cannot be measured in short run.
By making changes in the method of stock calculation, EVA changes immediately. It is not at all feasible to maintain static stock calculation method.
EVA does not take into consideration the effects of inflation.
There are no legal provisions or regulations for controlling EVA.
If more consideration is paid on EVA then it is quite obvious that other aspects may not be considered on equal footage.
EVA takes into consideration huge investment. EVA helps to yield little above the cost of capital .it does not take into consideration the high profitability on small investment.
EVA takes into consideration the total capital employed in the business along with its cost.
EVA focus that to do new investment but in the initial stage new investment having more expenses in a initial stage related.
EVA ignores inflation and it is biased against new assets
EVA is closely related to net present value (NPV) it is theoretically linked to corporate finance theory that value of firm will increase if you opt for positive NPV project.
It makes the top managers responsible for a measure that they have more control over. Rather than the one that they feed they cannot control.

### 2.8 STEPS FOR CALCULATING EVA

EVA = ADJUSTED NET PROFIT – WACC X Capital Employed.

#### 2.8.1 Adjusted Net Profit:

Adjusted Net Profit is a profit after making certain adjustment in Net Operating Profit after Interest & Tax. Adjustment regarding Profit is given below. NOPAT is a measure of a company’s cash generation capability from recurring business activities and disregarding its capital structure (Dierks and Patel, 1997). Net Operating Profit is quantum of net operating profit remained in the business after payment of interest and tax. Generally it is obtained from income statement of business organization.

#### Table No. 2.1

**Calculation of Net Operating Profit after Interest & Tax**

<table>
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<th>Amount</th>
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<tr>
<td><strong>Total Income</strong></td>
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<tr>
<td>- Direct Material Expenses</td>
<td>--</td>
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<tr>
<td>- Direct Labor Expenses</td>
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<tr>
<td>- Other Direct Expenses</td>
<td>--</td>
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<tr>
<td>- Indirect Material Expenses</td>
<td>--</td>
</tr>
<tr>
<td>- Indirect Labor Expenses</td>
<td>--</td>
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<tr>
<td>- Other Indirect Expenses</td>
<td>--</td>
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<tr>
<td>- Overhead Factory Expenses</td>
<td>--</td>
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<tr>
<td>- Office &amp; Administration Expenses</td>
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<tr>
<td>- Selling &amp; Distribution Expenses</td>
<td>--</td>
</tr>
<tr>
<td><strong>Operating/ Gross profit</strong></td>
<td></td>
</tr>
<tr>
<td>- Interest</td>
<td>--</td>
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<tr>
<td>- Depreciation</td>
<td>--</td>
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<tr>
<td>- Tax</td>
<td>--</td>
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<tr>
<td><strong>Net Operating Profit</strong></td>
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(Source: Computed by Researcher)
2.8.2 Capital Employed:

In calculation of EVA capital employed refers to economic capital, which means economic value of funds invested in a business. It consists of total amount in circulation and total amount of borrowings or debts raised.


NIBCLS = Non-interest bearing Current Liabilities.

Accounting Adjustment regarding Adjusted Net Profit & C.E.:

Certain accounting adjustments are necessary for computation of Adjusted Net Operating Profit after Tax and Capital Employed because certain accounting policies adopted by a company may wrongly classify revenue, expense, assets and liabilities.

1) Depreciation:

Depreciation on Fixed Assets has been provided on written down value method at rates specified in schedule XIV of the Companies Act. For assets impaired depreciation has been charged on pre impaired amount. As regards fixed assets acquired out of loan taken in foreign currencies loss or gain on such loans at the year-end is adjusted to the value of such fixed assets and depreciation on the differential amounts of fixed assets arising out of exchange loss or gains on foreign currency loan are adjusted over the remaining life of the concerned fixed assets. But to calculate EVA interest on exchange loss or gain should be charged to P&L A/C not Assets A/C, so it has been adjusted to calculate “Disclosed EVA”.

2) Impairment of Assets:

The Company has identified impairable assets at the end of the year in terms of Para 5 to 13 of AS-28 issued by ICAI and arrived at impairment loss therein being the difference between the book value and recoverable value of relevant assets.
Impairment loss, so arrived at, has been adjusted against opening general reserve as per transitional provision laid down in Para 124 of AS-28. This accounting policy has actual impact on EVA.

3) **Investment:**

Investment being long term in nature is held at cost. Provision will be made as and when deemed necessary under AS-13 issued by ICAI.

4) **Deferred Entitlement on LTC:**

In terms of the opinion of the Expert Advisory Committee of the ICAI, the Company has provided liability occurring on account of deferred entitlement towards LTC in the period in which the employees concerned render their services. So no accounting adjustments are necessary to calculate “Disclosed EVA”.

5) **Inventories:**

Stocks are valued at lower of cost or net realizable value. Basis of determination of cost remain as follows:

- Raw Materials, Packing Materials, Stores & Spares are valued on FIFO Basis.
- Work-In-Process valued at cost of input plus overhead up to the stage of completion.
- Finished Goods valued at Cost of Input plus Appropriate Overhead.

6) **Research and Development Expenses:**

Contributions towards scientific research expenses are charged to the profit & loss account in the year in which the contribution is made.

7) **Retirement Benefits:**

Liabilities in respect of retirement benefits to employees are provided for as follows:
• Leave salary of employees of the company on the basis of actuarial valuation.

• Gratuity liability on the basis of payment advice from Life Insurance Corporation of India from whom the company’s gratuity trust has taken.

• Liability for superannuation fund on the basis of the premium paid to Life Insurance Corporation of India in respect employees covered under the superannuation fund policy. So no accounting adjustments are required to calculate disclosed EVA.

8) Reorganization of Income and Expenses:
Sales and Purchase are accounted for on the basis of passing of title to the goods.

• Sales comprise of sale price of goods including excise duty and sales tax but exclude discount.

• Export sales are accounted for on the basis of date of bill of lading.

• All items of incomes and expenses have been accounted for on accrual basis.

So to calculate disclosed EVA no adjustments are required.

9) Deferred Taxation:
The liability of company is estimated considering the provision of the Income Tax Act 1961. Deferred Tax is recognized subject to the consideration of prudence, on time differences being the difference between taxable income and accounting income that originate in one period and capable of reversal in one or more subsequent periods. Tax effect accounting has the effect of spreading tax impact and estimating timing difference. This should be followed while determining EVA.

10) Foreign Currency Transaction:
In respect of foreign branches/offices, revenue items have been converted at average of month end exchange rates during the year. Fixed assets have been converted at the rates prevailing on dates of purchase. Assets & Liabilities other than
fixed assets are converted at the year-end exchange rate. Exchange gain or loss arising out of above is charged to profit & loss account.

As regards fixed assets acquired out of loan taken are foreign currencies, loss or gain on such loans at the year-end is adjusted to the value of such fixed assets. But to calculate disclosed EVA it has been adjusted. Capital Employed and Net Operating Profit after Tax have been charged due to that adjustment.

**Chart No. 2.1**

**Economic Value Added**

(Source: K. P. Singh & M. C. Garg)

11) Miscellaneous Expenditure:

- Share issue expenses are being amortized over a period of ten years.

- Technical know-how fees paid to Technical Collaborators are being amortized over a period of five years.

- Strategic Management Consultancy expenses are being amortized over a period of five years.
• Deferred Employees compensation under ESOP is being amortized on straight line basis over vesting period.

2.8.3 Cost of Capital:

The cost of capital is one of the important factors in any firm’s capital structure. From the viewpoint of investors, cost of capital is the reward of postponement of his present needs, so as to get a fair return on his investment in future. It serves as a benchmark to compare the worthiness of the investment made. The expected return on the capital invested by an investor should be at least equal to or more than the COC. In other words, the COC is the rate at which the investment made could earn from an alternative investment of equivalent risk. But from the viewpoint of the company, the cost of capital refers to the financial burden that a company has to bear in financing its business through various sources.

➢ Definition of COC:

◆ “The rate that must be earned on the net proceeds to provide the cost elements of the burden at the time they are due.” - Hunt, William & Donaldson

◆ “Cost of Capital is the minimum required rate of earnings or the cut – off rate of capital expenditure.” - Solomon Ezra

◆ “The rate of return the firm requires, from investment in order to increase the value of the firm in the market place.” - Hampton John J.

➢ Significance of COC:

The concept of cost of capital is most vital in financial management in many ways. In the past, the concept of cost of capital was neglected. In the past consideration was only capital procurement and allocation, whether it was owners or debt. But in the recent era, it is useful in deciding the capital structure of a company. It has great significance in the field of financial management. Recently, increasing attention is being paid to it by the academicians, as also by the newly appointed financial managers of the companies.
(1) For Capital Budgeting Decisions:
The concept of cost of capital helps in making financial decisions specially, in case of capital budgeting, it is used as a decision criterion in capital decision. If the present value of cash flows of the project is greater than the present value of investment in it, the project would be accepted. The rate of discount that is used to calculate the present value of future cash flows of the project is nothing but the cost of capital. Thus, cost of capital is the minimum rate of return required on investment projects. It is the rate of discount which is used to evaluate the profitability of an investment project. Thus, minimum rate of return of an investment project cut-off rate, target rate and hurdle rate are all synonyms used for the cost of capital.

If the investment project is to be evaluated on the basis of an internal rate or return, the project will be acceptable when the internal rate of return exceeds the cost of capital.

(2) Maintaining Market Value of Shares:
An important decision in the field of financial planning is concerning maximization of the equity shareholders' wealth. For the maximization of equity shareholders' wealth, it is necessary that market values of shares are maintained at a high level. The cost of capital is in fact that minimum rate of return which maintains the market value of shares as its current level. If a company succeeds in raising its earnings the market value of its shares would naturally move above this level. Thus, cost of capital serves as a criterion which helps in optimum utilization company's financial resources.

(3) Helps in Designing Capital Structure:
A proper capital structure can be built with the help of the concept of cost of capital. The lower the cost of capital, the stronger can be the market value of the firm. That is, they can move towards the goal of wealth maximization. Hence the capital structure should be planned in such a manner that cost of capital is minimized. This will raise the market value of the firm.
(4) **Issue of New Securities:**

If an investment scheme is found profitable, it may be necessary to issue new securities to raise money for this investment scheme. The concept of cost of capital provides guidance in deciding which type of securities should be used for this purpose. For taking such decisions the following must be taken into consideration: the nature of existing capital structure, the cost of capital of different sources of finance, the effect on aggregate cost of capital when money is raised through debts instead of equity shares etc. how to raise the required finance can be decided on the basis of the information about cost of existing capital and that of raising additional capital.

(5) **To Evaluate the Performance of Top Management:**

The concept of cost of capital is helpful also in evaluating the financial performance of the top management. For this purpose, actual profitability of the new scheme of investment is to be compared with the projected overall cost of capital, and actual cost incurred in raising required funds is also to be assessed.

(6) **Financial Decisions:**

The concept of capital is important in many other areas of financial decision making such as dividend decisions, working capital policy, capital budgeting decisions etc. the decision etc. the decision about dividends to be taken on the basis of the amount of profit that is to be reserved in the company, and the amount of reserves depends on the relation between its capital cost on the one hand and possible rate of return if it is invested in business, on the other.

➢ **Classification of Cost of Capital:**

The meaning of cost of capital given above is a general meaning. If fact, there are various classification of cost of capital which are relevant for different purposes.

(1) **Future Cost and Historical Cost:**

Historical cost is the cost of capital raised in the past, while future cost is the cost of capital to be raised in future. It is the future cost of capital which is significant in
making financial decision. Historical costs are important in that they help in predicting the future costs.

(2) Specific Cost and Combined Cost:
There are various sources of finance such as equity shares preference shares, debentures and long term loans. These are called components of capital. The cost of each of these components of capital is called specific cost. When the cost of raising funds from all sources is considered jointly, it is known as composite or combined cost of capital. It is called weighted average cost of capital also. It is the combined cost of capital which is significant in measuring the profitability of an investment scheme.

(3) Average Cost and Marginal Cost:
Average cost of capital is the weighted average cost of each component of capital employed by the company. The Weights assigned to different components of capital are according to their proportions in capital structure.

Marginal cost is the weighted average cost of new finance raised by the company. It is the additional cost of capital when the company goes for further rising of finance. For most of the financial decisions and for capital budgeting purposes, it is the concept of marginal cost which is more important.

(4) Explicit Cost and Implicit Cost:
The explicit cost of any source of finance is the rate of discount which equates the present value of its cash inflows with the present value of its cash outflows. Explicit cost is that rate of discount which equates the present value of all these cash outflows with the present value of cash inflow. The implicit cost of the chosen investment scheme is the rate of return on the best alternative that the firm has to sacrifice. Implicit cost arises when funds are invested in a particular project.

(5) Spot Cost and Normalized Cost:
Spot cost is the rate which is prevailing in the market at a certain point of time when a financing decision is to be taken involving appraisal of alternatives. Normalized
Conceptual Framework of CAPM Model & Economic Value Added

cost is the cost which is found out by some averaging process so that cyclical element is removed from it.

Chart No. 2.2
Types of Cost of Capital

(Source: Prepared by researcher)

A. Cost of Debt:

1) Cost of Perpetual Debt:

The cost of the debt is defined as the required rate of return that debt investment must yield to protect the shareholders’ interest.

\[ K_1 = \frac{I}{P} \times 100 \]

\( I = \) Interest annual,  
\( P = \) Net amount received,  
\( K_1 = \) Cost of debt

2) Impact of Tax:

Of course, this is cost of debt before tax. If tax is taken into consideration, the cost of debt would be less than this. Because interest paid on debt is tax deductible; this reduces the tax liability of the company.

Cost of debt after tax \( K_d = I \ (1 - t) \) or \( K_1 \ (1 - t) \)

Where \( I = \) Interest payable

\( t = \) tax rate
3) **Cost of Flotation:**
Certain costs are to be incurred to issue the shares or debentures. The examples are the cost of printing prospectus, legal expense advertisement cost, underwriting commission, brokerage etc. to the extent these costs are to be borne, and the company receives a smaller amount of money. Yet it has to pay a fix rate of interest on a smaller sum, which raises the cost of debt.

4) **Debt Issued at a Premium or Discount:**
The debentures may be issued at a premium or at a discount. If they are issued at a discount the company receives a smaller amount that the face value of the debenture and hence the cost of debt goes up. If they are issued at a premium the company receives a larger amount than the face value of its debentures and hence cost of debt goes down.

The researcher calculated the specific cost of debt after tax for each year with the help of following formula.

\[
K_d = \frac{\text{Total Interest}}{\text{Total debt}} \times (1 - t)
\]

Where \(K_d\) = cost of debt after tax

\[t = \text{tax rate} = \frac{\text{Total tax paid}}{\text{EBIT-I}}\]

Where EBIT = Earnings Before interest and Tax.

\[I = \text{Total Interest}\]

**B. Cost of Preference Share:**
As compared to debenture, it is a bit difficult to calculate the cost of preference capital, as the amount of interest on debentures is fixed, while it is not compulsory to pay dividend on preferences shares, in spite of the fact that the rate of dividend is fixed. Secondly, it is argued that preference dividend is not a charge on earnings; rather it is a distribution of profit. Hence, there is no cost of preference capital. This, however, is not true.

There is certain reason why dividend on preference capital is generally paid, even though it is not legally binding on the company to do so:
(1) If the company does not pay preference dividend, it cannot pay dividend on equity shares also, because it is obligatory for the company to pay preference dividend before equity dividend is paid.

(2) If the company does not pay dividend on equity shares, its credit standing is damaged. And it would find it difficult to raise funds in future.

(3) The market value of its shares is adversely affected, in case of its failure to pay dividend.

These are the reasons why a company generally pays the preference dividend when it has made sufficient profit, even though it is not legally compulsory to do so. Thus the preference capital does entail the cost which is calculated on the basis of the rate preference dividend.

The question of adjusting tax does not arise in case of preference capital, because dividend on preference shares is paid out of profit after taxes and the dividends is not tax deductible. Hence, taxes are not taken into account on preference shares, as it is done in case of debentures.

We shall divide preference shares into two parts for the purpose of computing cost of preference capital viz. Irredeemable preference shares and redeemable preference shares.

1) **Irredeemable Preference Shares:**

The principal amount of preference shares is not being returned during the lifetime of the company. Hence, the burden on the company is that of only annual dividend. Thus the computation of the cost of preference capital is comparatively easy. The formula used is as follows:

\[
K_p = \frac{D}{P} \times 100
\]

Where

- \(K_p\) = Cost of preference Capital
- \(D\) = Preference Dividend
- \(P\) = Net Proceeds.
2) Redeemable Preference Shares:
When preference shares are redeemable, i.e. when the principal amount is to be returned after the period, it entails two types of burden: principal amount and dividend.

The formula used for computing the cost of preference capital is the same as that used debentures, except that it is not to be adjusted for tax as the preference dividend is not tax deductible.

Hence the formula will be as follows.

\[ K_p = \frac{R \times X}{\frac{1}{2} (F - P)} \times 100 \]

Where \( X = \frac{1}{n} \) \( (F - P) \)
\( F = \) Face Value, \( P = \) Net proceeds,
\( R = \) Rate of interest, \( n = \) Number of years.

C. Cost of Retained Earnings:
The retained earnings are one of the major sources of finance available for the established companies to finance its expansion and diversification programs. These are the funds accumulated over years of the company by keeping part of the funds generated without distribution. The equity shareholders of the company are entitled to these funds and sometimes, these funds are also taken into account while calculating the cost equity. But as long as the retained profits are not distributed to the shareholders the company has further profitable investment opportunities.

Hence cost of equity includes retained earnings. But in practice, retained earnings are a slightly cheaper source of capital as compared to the cost of equity capital. Therefore the cost of retained earnings is treated separately from the cost of equity capital.

The cost of retained earnings to the shareholders is basically an opportunity cost of such funds to them. It is equal to the income that they would otherwise obtain by placing these funds in alternative investment. The cost of retained earnings is determined based on the opportunity rate of earnings of equity shareholders which is
being forgone continuously. If the retained earnings are distributed to the equity shareholders attract personal taxation of the individual shareholders and therefore, the cost of earnings is calculated as follows:

$$KR = KE (1 - T)$$

Where $KR = \text{Cost of retained Earnings}$

$KE = \text{Cost of equity capital}$

$T = \text{Tax rate of individuals}$

D. Cost of Equity Share:
The funds required for the project are raised from the equity shareholders who are of permanent nature. These funds need not be repayable during the life time of the organization. Hence it is a permanent source of funds. The equity shareholders are the owners of the company. The main objective of the firm is to maximize the wealth of the equity shareholders. Equity share capital is the risk capital of the company. If the company's business is doing well the ultimate beneficiaries are the equity shareholders who will get the return in the form of dividends from the company and the capital appreciation for their investment. If the company comes for liquidation due to losses, the ultimate and worst suffers after the equity shareholders. Sometimes they may not get their investment back during the liquidation process.

Profits after taxation, less dividends paid out to the shareholders, are funds that belong to the equity shareholders which have been reinvested in the company and therefore, those retained funds should be included in the category of equity, the cost of retained earnings is discussed separately from cost of equity capital the cost of equity may be defined as the minimum rate of return that a company must earn on the equity financed portion of an investment project so that market price of the shares remain unchanged. The following methods are used in calculation of equity.

1) Dividend Yield Method:
The dividend per share is expected on the current market price per share. As per this method, the cost of capital defined as "the discount rate that equates the present value all expected future dividends per share with the net proceeds of the sale (or the
current market price) of the share." This method is based on the assumption that the market value of shares is directly related to the future dividends on the shares. Another assumption is that the future dividend per share is expected to be constant and the company is expected to earn at least this yield to keep the shareholders content.

\[ K_E = \frac{D_1}{P_E} \]

Where \( KE \) = Cost of Equity
\( D_1 \) = Annual Dividend per share
\( PE \) = Ex-dividend market price per share

This method emphasizes on future dividend expected to be constant. It does not allow for any growth rate. But in reality, a shareholder expects the returns from his equity investment to grow over time. This approach has no relevance to the company.

2) **Dividend Growth Model:**
Shareholders will normally expect dividend to increase year after year and not to remain constant in perpetuity. In this method, an allowance for future growth in dividend is added to the current dividend yield. If is recognized that the current market price of a share reflects expected future dividends. The dividend growth model is also called as 'Gordon dividend growth model'.

\[ K_E = \frac{D_1}{P_E} + g \]

Where \( D_1 \) = Current dividend per Equity share
\( PE \) = Market price per equity share
\( g \) = Growth in expected dividend

3) **Price Earning Method:**
This method takes into consideration the Earnings per share (EPS) and the market price of the share. It is based on the assumption that the investors capitalize the stream of future earnings of the share and the earnings of a share need not be in the form of dividend and also it need not be disbursed to the shareholders. It based on
the argument that even if the earnings are not disbursed as dividends, it is kept in the retained earnings and it causes future growth in the earnings of the company as well as the increase in market price of the share. In calculation of cost of equity share capital, the earnings per share is divided by the current market price.

\[ K_E = \frac{E}{M} \]

Where \( E \) = Current earnings per share
\( M \) = Market price per share

2.9 CAPITAL ASSET PRICING MODEL (CAPM) AS A TOOL TO MEASURE COE

It is a model that describes the relationship between risk and expected return. It explains the behavior of security prices. The relationship between expected return and unavoidable risk, and the valuation of securities that follows, is the essence of the capital asset pricing model. This model divides the cost of equity into two components: one, risk-free return generally obtained in government securities and second risk premium for investing in shares. This model was developed by William F. Sharpe and John Lintner in the 1960s. This model is simple in concept and has real world applicability.

Capital Asset Pricing Model is one of the most important techniques to evaluate the corporate sector unit. Capital Asset Pricing Model as the name suggests, is a theory that explain how asset prices are formed in the market place. It is a logical and major extension of the portfolio theory of Markowitz by William Sharpen (1964), John Lintner (1965) and Jan Mossin (1967).

Thus, CAPM has implied for….

1. Risk – Return Relationship for an efficient portfolio.
2. Risk – Return Relationship for an individual asset/security.
3. Identification of under and overvalued assets traded in the market.
4. Pricing of assets not yet traded in the market.
5. Effect of leverage (Risk) on the cost of equity (rate of return required by equity shareholders).
(6) Capital budgeting decision and Cost of Capital.
(7) Risk of the firm through diversification of project portfolio.

2.10 HISTORY & EVOLUTION OF CAP MODEL

In tracing the origin of the CAPM two papers appear to have been the primary inspiration. In 1952, Harry Markowitz provided the first truly accurate justification for selecting and diversifying a portfolio with the publication of his paper “Portfolio Selection.” Later, he would expand his mean – variance analysis to a book-length study (1959) which firmly established portfolio theory as one of the pillars of financial economics. Markowitz’s work presents a direct and obvious root to the CAPM.

After the publication of Markowitz's (1959) Portfolio Selection book, Jack Treynor (1961) started intensive work on the theory of asset pricing. The intention of Treynor's paper is “to lay the groundwork for a theory of market value which incorporates risk”. After Treynor began his work on asset pricing, Sharpe also set out to determine the relationship between the prices of assets and their risk attributes. The paper published by Sharpe (1964) notes that through diversification, some of the risk inherent in an asset can be avoided so that its total risk is obviously not the relevant influence on its price; unfortunately little has been said concerning the particular risk component which is relevant. Sharpe aims to use the theory of portfolio selection to construct a market equilibrium theory of asset prices under conditions of risk and notes that his model sheds considerable light on the relationship between the price of an asset and the various components of its overall risk.

After that Lintner (1965) used regressions to determine betas for a set of 301 stocks from 1954 to 1963. Then he performed a cross-sectional regression to test the security market line, regressing each stock’s return over the period against its beta and its residual risk. He found evidence that the residual risk is priced, contradicting the CAPM’s predictions. In response, Miller and Scholes critiqued some of the statistical problems with Lintner’s model, and found that the misestimating betas caused a significant problem. Black, Jensen, and Scholes (1972) attempted to correct
this by forming deciles portfolios of stocks to reduce this misestimating; they found strong support of the two-factor or zero-beta form of the CAPM. Fama and MacBeth (1973) highlighted the evidence (i) of a larger intercept term than the risk-free rate, (ii) that the linear relationship between the average return and the beta holds and (iii) that the linear relationship holds well when the data covers a long time period. Subsequent studies, however, provide weak empirical evidence on these relationships.

2.11 ASSUMPTION UNDER CAPM

1) All investors are price – takers. Their number is so large that no single investor can affect price.
2) All investors use the mean – variance portfolio selection model of Markowitz.
3) Assets/Securities are perfectly divisible.
4) All investors plan for one identical holding period.
5) Homogeneity of expectation for all investors results in identical efficient frontier and optimal portfolio.
6) Investors can lend or borrow at an identical risk – free rate.
7) There are no transaction costs and income taxes.

CAPM can compute with the Following Equation:

\[ R_j = R_f + \beta_j \times (R_m - R_f) \]

Where \( R_j \) = The expected rate of return on security j
\( R_f \) = Risk – free rate of interest
\( \beta_j \) = The beta co-efficient of systematic risk of security j
\( R_m \) = The Expected rate of return on the market portfolio of Securities

2.12 IMPORTANT MEANINGS UNDER CAPM

2.12.1 Risk:
Risk may be defined as the likelihood that the actual return from an investment will be less than the expected or forecast return. In other words it is the variability of return from an investment.
In case of securities, there are two types of risks. (1) Unsystematic risk or diversifiable risk or avoidable risk (2) Systematic risk or unavoidable risk. The unsystematic risk is specific to a particular firm such as strikes, loss of a big contract, increase in customs duty by the government of the materials used by the firm etc. An investor can eliminate or reduce this risk by diversifying the security investment. He can sell some of these securities and buy securities of other firms. But systematic risk is unavoidable. It affects all firms. It arises on account of the economy-wide uncertainties. It cannot be avoided or reduced through diversification e.g. it may arise due to increase in inflation, war, change in government interest rate policy, change in tax policy etc.

There are two types of securities in which investment can be made. The first is a risk free security whose return (income) over the whole period is known with certainty. For example, in India, Relief Bonds carry a fixed rate of tax free return. It has zero variance or standard deviation. The risk free security will have the same return under all types of economic conditions. The second type of security is risky security like equity shares available in the market.

The CAPM provides a framework of measuring the systematic risk of an individual security. The risk of individual security is measured by $\beta$ (beta). On that basis, CAPM can be calculated by following equation. There are many ways to measure risk; some of them are as follows:

➢ **Types of Risk**

Unfortunately, the concept of risk is not a simple concept in finance. There are many different types of risk identified and some types are relatively more or relatively less important in different situations and applications. In some theoretical models of economic or financial processes, for example, some types of risks or even all risk may be entirely eliminated. For the practitioner operating in the real world, however, risk can never be entirely eliminated. It is ever-present and must be identified and dealt with. In the study of finance, there are a number of different types of risk has been identified. It is important to remember, however, that all types of risks exhibit the same positive risk return relationship.
A. Systematic Risk:
It is also known as market risk or economic risk or non diversifiable risk & it impacts full economy or share market. Let’s say if interest rate will increase whole economy will slow down & there is no way to hide from this impact. As such there is no way to reduce systematic risk other than investing your money in some other country. Beta can be helpful in understanding this.

B. Unsystematic Risk:
It affects a small part of economy or sometime even single company. Bad management or low demand in some particular sector will impact a single company or a single sector – such risks can be reduced by diversifying once investments. So this is also called Diversifiable Risk.

Chart No. 2.3
Types of Risk

(Source: MBA Thesis of Jawaharlal Technological University, Hyderabad)
A. Systematic risk

i. Interest Rate Risk
The uncertainty associated with the effects of changes in market interest rates. There are two types of interest rate risk identified; price risk and reinvestment rate risk. The price risk is sometimes referred to as maturity risk since the greater the maturity of an investment, the greater the change in price for a given change in interest rates. Both types of interest rate risks are important in investments, corporate financial planning, and banking.

➢ Price Risk:
The uncertainty associated with potential changes in the price of an asset caused by changes in interest rate levels and rates of return in the economy. This risk occurs because changes in interest rates affect changes in discount rates which, in turn, affect the present value of future cash flows. The relationship is an inverse relationship. If interest rates (and discount rates) rise, prices fall. The reverse is also true. Since interest rates directly affect discount rates and present values of future cash flows represent underlying economic value, we have the following relationships.

➢ Reinvestment Rate Risk:
The uncertainty associated with the impact that changing interest rates have on available rates of return when reinvesting cash flows received from an earlier investment. It is a direct or positive relationship.

ii. Market risk
This is the risk that the value of a portfolio, either an investment portfolio or a trading portfolio, will decrease due to the change in market risk factors. The four standard market risk factors are stock prices, interest rates, foreign exchange rates, and commodity prices:

✔ Equity risk is the risk that stock prices in general (not related to a particular company or industry) or the implied volatility will change.
✓ Interest rate risk is the risk that interest rates or the implied volatility will change.

✓ Currency risk is the risk that foreign exchange rates or the implied volatility will change, which affects, for example, the value of an asset held in that currency.

✓ Commodity risk is the risk that commodity prices (e.g. corn, copper, crude oil) or implied volatility will change.

iii. Inflation Risk (Purchasing Power Risk)
Inflation risk is the loss of purchasing power due to the effects of inflation. When inflation is present, the currency loses its value due to the rising price level in the economy. The higher the inflation rate, the faster the money loses its value.

B. Unsystematic risk

i. Business risk
The uncertainty associated with a business firm’s operating environment and reflected in the variability of earnings before interest and taxes (EBIT). Since this earnings measure has not had financing expenses removed, it reflects the risk associated with business operations rather than methods of debt financing. This risk is often discussed in General Business Management courses.

ii. Financial risk
The uncertainty brought about by the choice of a firm’s financing methods and reflected in the variability of earnings before taxes (EBT), a measure of earnings that has been adjusted for and is influenced by the cost of debt financing. This risk is often discussed within the context of the Capital Structure topics.

iii. Total Risk
While there are many different types of specific risk, we said earlier that in the most general sense, risk is the possibility of experiencing an outcome that is different from what is expected. If we focus on this definition of risk, we can define what is referred to as total risk. In financial terms, this total risk reflects the variability of returns from some type of financial investment.
Measures of Total Risk

The standard deviation is often referred to as a "measure of total risk" because it captures the variation of possible outcomes about the expected value (or mean). In financial asset pricing theory the Capital Asset Pricing Model (CAPM) separates this "total risk" into two different types of risk (systematic risk and unsystematic risk). Another related measure of total risk is the "coefficient of variation" which is calculated as the standard deviation divided by the expected value. It is often referred to as a scaled measure of total risk or a relative measure of total risk. The following notes will discuss these concepts in more detail.

Methods for Measurement of risks

Statistical measures that are historical predictors of investment risk and volatility and major components in modern portfolio theory (MPT). MPT is a standard financial and academic methodology for assessing the performance of a stock or a stock fund compared to its benchmark index. There are five principal risk measures:

1. Beta/ Coefficient:

A measure of the volatility or systematic risk of a security or a portfolio in comparison to the market as a whole “Beta” is used in the capital asset pricing model (CAPM), a model that calculates the expected return of an asset based on its beta and expected market returns, also known as ‘Beta coefficient’. Beta is calculated using regression analysis, and you can think of beta as the tendency of a security's returns to respond to swings in the market. A beta of 1 indicates that the security's price will move with the market. If beta is less than 1 means that the security will be less volatile than the market. A beta of greater than 1 indicates that the security's price will be more volatile than the market. Beta can be found by following formula:

$$\beta = \frac{\text{Cov}(r_j, r_m)}{\sigma^2_m}$$

Where as $\beta = \text{risk coefficient}$/ Systematic risk

$j = \text{Stock return}$
\[ m = \text{Sensex return} \]
\[ \sigma^2 = \text{Variance of stock return} \]

**Alpha**

Alpha measures performance on a risk-adjusted basis. Alpha takes the volatility (price risk) of a mutual fund and compares its risk-adjusted performance to a benchmark index. The excess return of the fund relative to the return of the benchmark index is a fund's alpha.

Alpha is one of five technical risk ratios; the others are beta, standard deviation, R squared, and the Sharpe ratio. These are all statistical measurements used in modern portfolio theory (MPT). All of these indicators are intended to help investors determine the risk-reward profile of a mutual fund. Simply stated, alpha is often considered to represent the value that a portfolio manager adds to or subtracts from a fund's return. A positive alpha of 1.0 means the fund has outperformed its benchmark index by 1%. Correspondingly, a similar negative alpha would indicate an underperformance of 1%.

If a CAPM analysis estimates that a portfolio should earn 10% based on the risk of the portfolio but the portfolio actually earns 15%, the portfolio's alpha would be 5%. This 5% is the excess return over what was predicted in the CAPM model. Formula of Jensen alpha given below:

\[ \alpha = R_p - [R_f + \beta(R_m - R_f)] \]

Where
- \( R_p \) = Stock Return
- \( R_f \) = Risk free rate of return
- \( \beta \) = Stock Beta
- \( R_m \) = Market Return

**Standard Deviation:**

It is a measure of dispersion of expected returns. It is a statistical concept and is used to measure risk from holding a single security, a high std. deviation represents a low risk.
In finance, standard deviation is applied to the annual rate of return of an investment to measure the investment's volatility. Standard deviation is also known as historical volatility and is used by investors as a gauge for the amount of expected volatility. Standard deviation is a statistical measurement that sheds light on historical volatility. For example, a volatile stock will have a high standard deviation while the deviation of a stable blue chip stock will be lower. A large dispersion tells us how much the return on the fund is deviating from the expected normal returns.

\[ \sigma = \sqrt{\frac{\sum(X - \bar{X})^2}{n-1}} \]

**Definition of 'R-Squared':**

A statistical measure that represents the percentage of a fund or security's movements that can be explained by movements in a benchmark index. For fixed-income securities, the benchmark is the T-bill. For equities, the benchmark is the S&P 500. R-squared values range from 0 to 100. An R-squared of 100 means that all movements of a security are completely explained by movements in the index. A high R-squared (between 85 and 100) indicates the fund's performance patterns have been in line with the index. A fund with a low R-squared (70 or less) doesn't act much like the index. A higher R-squared value will indicate a more useful beta figure. For example, if a fund has an R-squared value of close to 100 but has a beta below 1, it is most likely offering higher risk-adjusted returns. A low R-squared means you should ignore the beta. When most people think of investments they think of stocks or mutual funds. An investment is more than this. An investment requires one to set aside an amount today with the expectation of receiving a larger sum in the future.

**Sensitivity Analysis:**

This is a method of considering a number of the worst (pessimistic), the expected (most likely) and the best (optimistic) return. The difference between optimistic and pessimistic results is the range which is the basic measure of risk. The greater the range, the more risky the security is. The probability distribution is also used to measure the risk. If a particular event is sure to happen, its probability is 100%. If
the possibility is that the event is likely to happen 8 times out of 10, the probability is 80%.

2.12.2 Risk – free rate of return:

The rate of return who have zero volatility that is known as risk – free assets. The proxies for the risk free asset are many like Bank Rate, T-Bill rate for 91 days, 180 days and 365 days, Government Bonds etc.

Here in the present study researcher takes RBI’s Government bond yield as risk free rate of return.

A bond represents a contract under which a borrower promises to pay interest and principal on specific dates to the holders of the bond.

Bonds are issued by a variety of organizations. The principal issuers of the bonds in India are the central government, state government, public sector undertakings, private sector companies and municipal bodies.

- Bonds issued by the central government are called treasury bonds. These are bonds which have maturities up to 20 years. These bonds generally pay interest semi – annually. Presently, treasury bonds dominate the Indian bond market in terms of market capitalization, liquidity and turnover.

- State government bonds are issued by state governments. These bonds have maturities that generally range from 3 to 20 years and pay interest semi – annually.

- Bonds issued by companies are classified into two types: PSU (public sector undertakings) bonds & private sector bonds. PSU bonds are bonds issued by companies in which the central or state government has an equity stake in excess of 50 percentages. Some of these bonds enjoy a tax – free status whereas others are taxable.
Private sector bonds are bonds issued by private sector companies. Bonds issued by companies, PSU bonds as well as private sector bonds generally have maturity ranging from 1 to 15 years and pay interest semi-annually.

2.12.3 Realized rate of return:
The rate of return actually received on an investment over a specific holding period. For proposed study daily stock prices of BSE – Sensex companies have been taken from authenticated database of capitaline.com. For common stock, realized rate of return at time t is measured by:

\[ R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \]

Where \( R_t = \) Rate of Return

\( P_1 = \) Today’s Stock Price

\( P_0 = \) Yesterday’s Stock Price

2.12.4 Expected Rate of Return on Market Index:
Rate of return on market index represents return on market index. The rate of return on market index are many like return on BSE – Sensex, return on Nifty – fifty etc.

In the present study researcher have taken return on BSE Sensex as Market proxy.

2.13 RISK – RETURN RELATIONSHIP
In order to be acceptable, a higher – risk security must offer a higher forecast return than a lower – risk security. If we draw a graph on which we show expected return and degree of risk the "market line" will be formed, which will slop upwards, suggesting that higher the risk, higher is the return expected.

2.14 THE SECURITY MARKET LINE (SML)
In market equilibrium, the expected return of a security – E (Ri) - and the systematic risk (\( \beta_i \)) have a linear relationship which is known as the Security Market Line (SML). Under the assumptions of the CAPM, every security lies on the SML.

We can illustrate the concept by the diagram that follows:
If a security has a return in excess of the SML for the same level of systematic risk, such as point A in the diagram, investors will purchase that security and consequently its price will rise and return will fall, pushing point A back to the SML. The reverse will happen for points below the SML such as point B in the diagram.

2.15 RISKS-RETURN TRADE–OFF

The risk-return tradeoff assumes that markets are efficient and no alpha-profit could be found: if a higher expected return can be found there will be a rush to buy this security and the price of the security will increase. If the investor then buys the security when the price has already risen, she can expect a fair return given the risk taken, but no more than that. Similarly a security with too high risk relative to the price, there will be a rush to sell and the price will decrease until the risk matches the return of the stock and equilibrium is reached. This is the basic assumption of the risk-return tradeoff: the investor expects higher return when taking on securities with higher risk.

The concept of the risk-return tradeoff is used to explain the relationship between risk and return. The hypothesis states that potential return increase when risk increases, and so this relationship is linear. Basically, an investor is only accepting taking on more risk if compensated by a higher rate of return.
2.16 ADVANTAGES OF CAPM

1. It considers only systematic risk, reflecting a reality in which most investors have diversified portfolios from which unsystematic risk has been essentially eliminated.

2. It is generally seen as a much better method of calculating the cost of equity than the dividend growth model (DGM) in that it explicitly takes into account a company’s level of systematic risk relative to the stock market as a whole.

3. It is clearly superior to the WACC in providing discount rates for use in investment appraisal.

4. CAPM can serve as a benchmark for understanding the capital market phenomena that cause asset prices and investor behavior to deviate from the prescriptions of the model.

2.17 DRAWBACKS OF CAPM

CAPM has been evaluated numerous of times and there are several researches made stating that model to be a strictly theoretical model which cannot be used in practice, only telling us what a risk premium should be. There are many drawbacks regarding CAPM in which first, there is the problem with stocks being extremely volatile and hence tests of average return, as CAPM, will be affected. Moreover, critics argue that the market index used in the researches is not really representing the market portfolio of CAPM. Finally, investors cannot actually borrow at the risk-free rate as CAPM assumes (Bodie, Kane & Marcus, 2011 pp.438).

The American economist Richard Roll has been known for his criticism towards the CAPM. According to him there are five major problems with the model:

- There is a single testable hypothesis associated with the CAPM: the market portfolio is mean-variance efficient.

- The CAPM relies on the assumption about markets being efficient, where there is a linear relation between the beta and the expected return. This relation is not
independent since it has to rely on another assumption, namely the efficiency of the market portfolio.

- In any sample of observations of individual returns there will be an infinite number of ex post mean-variance efficient portfolios using the sample-period returns and co variances. Betas calculated between these mean-variance portfolio and individual stocks will be linear related to average returns.

- The CAPM cannot be tested unless the true market portfolio can be used. This means we need to use all stocks there are to include in the market portfolio, which in reality is an impossible task.

- Using a market proxy instead of the real market portfolio creates a problem if the proxy is mean-variance but the real market portfolio is not, which may lead to the market proxy being inefficient. Moreover, using a market proxy which is highly correlated to other proxies and to the market portfolio but all of them not necessarily mean-variance efficient, will lead to different results when using different proxies, even though they are all highly correlated, because the mean-variance dilemma. This problem is known as “benchmark error”, where in this case the market proxy is the benchmark.
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Books


Research Papers


