CHAPTER 2

RETURN & RISK

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*Relationship between risk & return is the key concept of finance.

*Risk & return are the key features of investment.

*Maximum return & Minimum risk is the ultimate objective of any investment

RETURN

*Benefit associated with the investment.
*An investor can expect 2 kinds of return:
-Normal income in the form of Dividend/Int
-Capital gain/Appreciation
*So total Return:

Total Return=Income + Capital Gain(S.P-P.P)

Eg:Mr A bought shares of a co for Rs 100.The rate of return is 8%.After holding it for some time,He sold it for Rs 120.Calculate Total return?

A.Total Return=Income + Capital gain(S.P-P.P)

*Income=Dividend from investment

8% of Rs 100

Rs 8

*Price change= S.P-P.P

120-100=Rs 20

Total return=Rs 8+ Rs 20=Rs 28

RISK

*Uncertainty about the future benefits to be realised from the investment

*It includes the possibility of losing some or all of the original investment.

Consider the return from 2 securities.

A-25%,12%,4%,22%,7%

B-16%,13%,11%,17%,13%

Avg Return of both A & B- 14%

Riskier?????????? **Stock A**

*Stock A have more fluctuations in return than Stock B.

***Higher the variability/ volatality of return Greater will be the risk.**

*Investments must be compared on the basis of risk & return.

***As risk increases ,Return to compensate the risk must also increase.**

This is risk-return trade off.

*So investor will have to select between :

1.Higher return with higher risk

2.Lower return with lower risk.

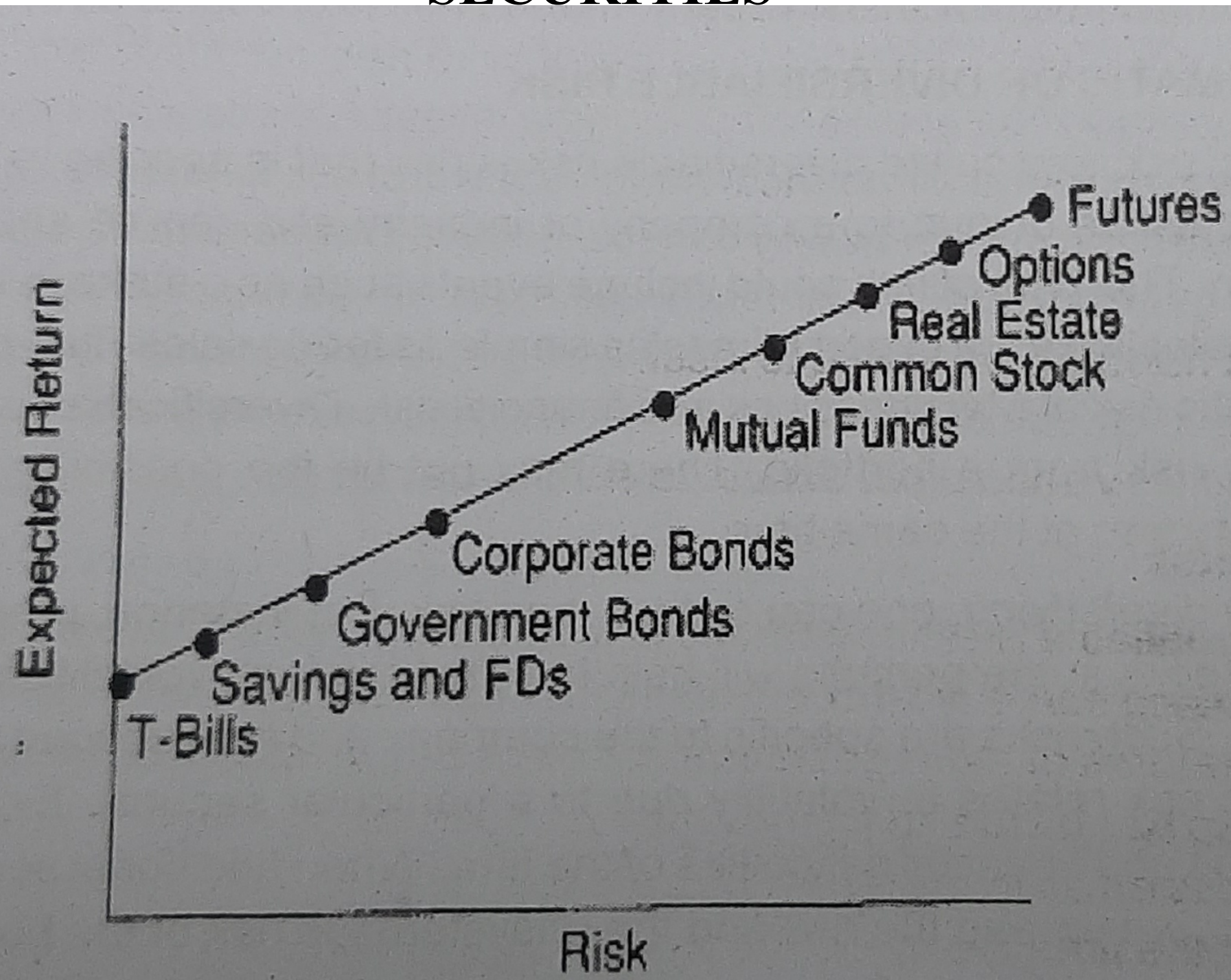
Cz risk & return have positive relationships

DIVERSIFICATION

***Technique that reduces risk by allocating investments among various financial instruments, industries, and other categories.**

*Aims to maximize returns by investing in diff areas that would each react differently to the same event

RISK –RETURN PROFILE OF VARIOUS SECURITIES



TYPES OF RISK

SYSTEMATIC RISK
UNSYSTEMATIC RISK

1. SYSTEMATIC RISK

*Occurrence of certain events will affect the entire economy & not just specific firms.
*Such events originate from uncontrollable forces.
*It affects all stocks in the market.
*Investors cant use diversficatin to eliminate risk
*Cz it affects entire economy(All stocks).....**So**

- **Systematic risk is that part of the total risk that is caused by factors beyond the control of a specific company or individual**

- Also known as **Un-diversifiable risk.**
- *Eg: Inflation, changes in interest rates, fluctuations in currencies, recessions, wars*

*All securities will have systematic risk.
*As it cant be diversified.
*If the Stock market falls due to economic factors, all stocks will fall and vice versa
*Measured by Beta.

2.UNSYSTEMATIC RISK

* Risk that is unique to a specific company or industry.

*Diversification can be used to eliminate unsystematic risk from portfolio.

- **Unsystematic risk, is the risk that relates to a particular security or a industry and can be sharply reduced by diversification.**

- Also known as **Diversifiable risk.**
- *Eg:Labour problems,business risk,market risk*

SOURCES OF RISK

1.Market risk

***Variability in a security's return resulting from fluctuations in the market is market risk.**

*All securities are exposed to market risk.

- *Recessions, Wars,structural changes,tax law changes,etc.*
- Market risk occurs due to investors reaction in stock market.
- SM is affected by:

  Tangible events-P/S/E events

  Intangible events-Market psychology

2.Interest rate risk

***Variability in a security's return from changes in the level of interest rate is interest rate risk.**

*These changes affect the fixed income securities.

***When market int rate increase , Bond price decreases**

***When market rate decreases , Bond price increases.**

Bond Int rate 6% Market int 5%(Bank)

Bonds ll be preferred.

*Bt Market int rate inc to 7%

Demand for market security increases

but

Demand for Bond will decrease

When D dec;

Price of bond will decrease

***So when market int rate increase , Bond price decreases**

Bond Int rate 6% Market int 7%(Bank)

Market security ll be preferred.

Bt Market int rate dec to 5%

Demand for market security decreases

But

Demand for Bond will increase

When D inc

Price of bond will increase.

***So when market rate decreases,Bond price increases.**

3.Regulation risk

***Regulatory risk is the risk that a change in laws and regulations will impact a security, business, sector, or market.**

*Some securities will get benefited.

*Some " Will get adversely affected.

4.Business risk

***Risk of doing business in a particular business or enviornment is business risk.**

*Eg:Financial Risk,Reputation Risk,Operational Risk,Competition Risk

5.Purchasing power risk/Inflation risk

***Inflationary risk is the risk that inflation will reduce an investment's returns through a decline in purchasing power.**

*Inflation inc , Purchasing power will dec
*So P.P of invested amount & return will dec
*Thus , investors demand nominal return than real return.
***So during inflation int rates inc,as investors demand additional premium for compensation loss of P.p**

6.Reinvestment risk

***Reinvestment risk refers to the possibility that an investor will be unable to reinvest cash flows at a rate equal to their current rate of return.**

*That an investment's cash flows will earn less when invested in a new security.

*Zero coupon bonds are best to avoid this kind of risk

*Reinvestment risk reduces the chances of reduction in computed YTM

7.International Risk

A . Exchange rate risk/Currency risk

***Exchange rate risk, also known as currency risk, is the financial risk arising from fluctuations in the value of a base currency against a foreign.**

*Happens when invested in securities in foreign country & currency.

Eg:Invested in US co

US dollar value decreased: So return will also decrease

B. Country risk

***Country risk refers to the economic, political and business risks that are unique to a specific country, and that might result in unexpected investment losses.**

*While conducting international business,foreign country's economic stability should be considered.

8.Liquidity risk.

***Liquidity risk is the risk that a company may be unable to meet short term financial demands**

*Treasury bills have no liquidity risk.

*Small over the counter stocks have liquidity risk

Regression Method

*It establishes relationship between a dependent variable & independent variable.

*The variables are:

1.The Independent variable is β

Systematic risk of a security.

2.The Dependent variable is α

Residual risk that remain even after all risk has been calculated & reduced

Equation for regression is:

$$y = \alpha + \beta x$$

$$\beta = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$\alpha = \bar{y} - \beta\bar{x}$$

$$\bar{y} = \frac{\Sigma y}{n}$$

$$\bar{x} = \frac{\Sigma x}{n}$$

Q . For the question ACC stock & BSE Index calculate Beta under Regression.

$$\beta = \frac{n\Sigma xy - (\Sigma x)\,\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$\beta = \frac{6*606.73 - (59.74)(59.83)}{6*611.66 - (59.74)^2}$$

$$= \frac{3640.38 - 3574.24}{3670.08 - 3568.86} \quad = .65$$

$$\bar{y} = \frac{59.83}{6} = 9.97$$

$$\bar{x} = \frac{59.74}{6} = 9.95$$

$$\alpha = \bar{y} - \beta\bar{x}$$

$$= 9.97 - (.65 * 9.95)$$

$$= 3.5$$

CAPITAL ASSET PRICING MODEL

A model that describes the relationship between between risk & return of risky securities.

*It defines the relationship of the **expected rate of return** as a **function** of the **risk free interest rate** , **investment beta** & **expected market risk premium.**

$$R_i = R_f + \beta_i * (R_m - R_f)$$

R_i = Return of security

R_f = Risk free rate

β_i = Beta of the security

R_m = Market Return

$(R_m - R_f)$ = Premium for higher risk

*CAPM use the principle that the return on shares in the market is expected to be higher than the return of risk free investment due to higher risk.

*The diff between market return & risk free return is Excess Return/Premium for higher risk

*Return TB = 20%; Return on Market security = 28%

*Excess return from market for bearing higher risk is 8%

CAPM functions on the basis of following assumptions:

1. Investors require a high return than risk free rate , to compensate systematic risk
2. Investor do not require premium for Unsystematic risk , as it can be diversified through portfolio.
3. As systematic risk varies between companies , investor will require a higher return from those companies with high systematic risk.

Uses of CAPM:

*Important tool in project appraisal , to compare projects to identify rate of return & risk.

Limitations :

*Difficult to calculate the risk free return under various economic conditions

*Cant be used for investment projects appraisal with more than 1 yr

Q.If shares of MLL ltd have beta factor of 1.2 with risk free return as 8% and market return as 10.5 %.What will be the expected return

Ans:

$$R_i = R_f + \beta_i * (R_m - R_f)$$

=8+1.2*(10.5-8)

=11%

SECURITY MARKET LINE

SML is the graphical representation of CAPM.

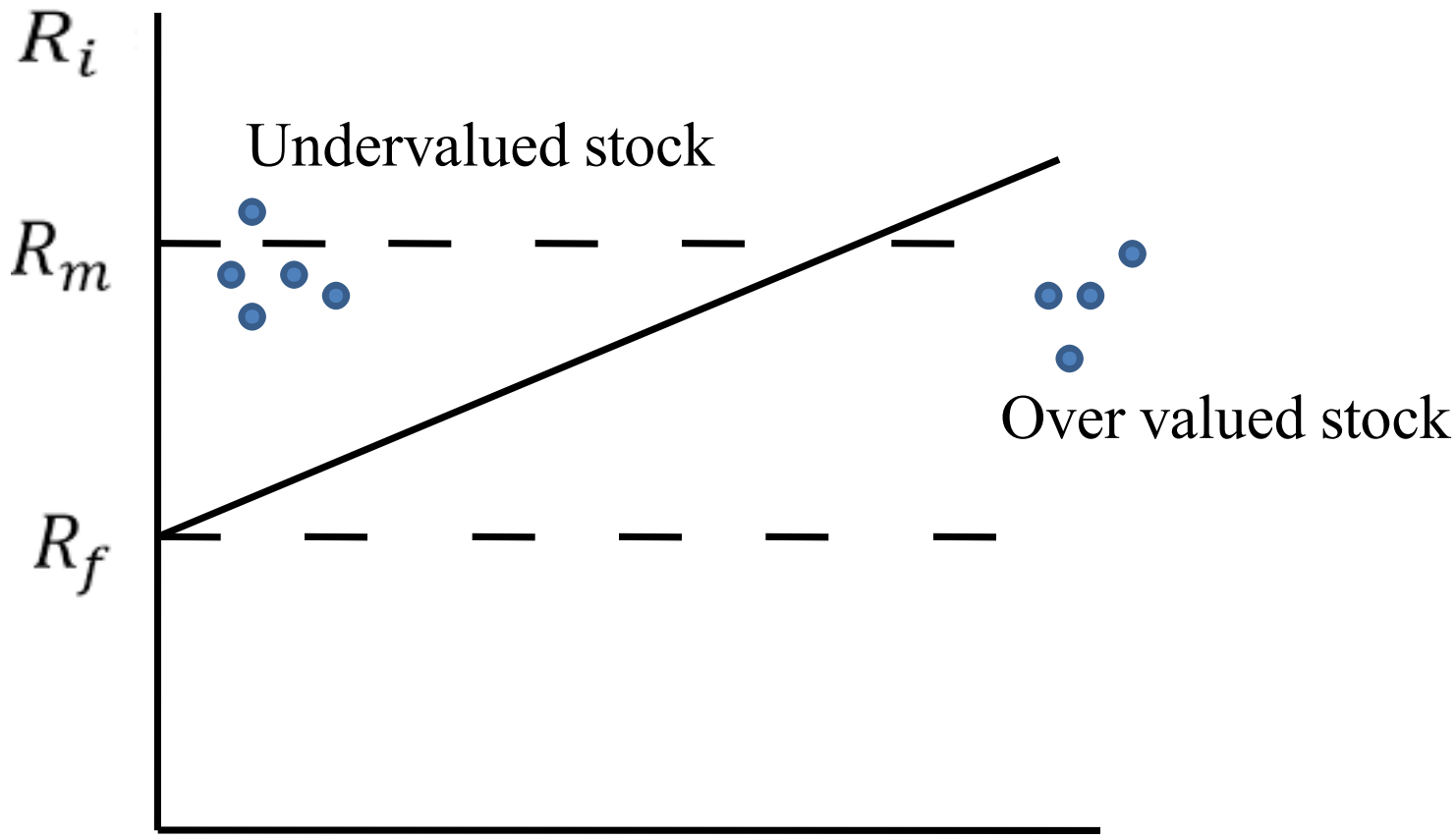
*It is a line that indicates most efficient return and risk to an investor.

*Assumes that risk & return moves in the same direction

*Risk seekers assume high risk for higher return

*Risk averse investors will select the securities that are risk free

*The SML shows the risk return ration an investor should go for



*The line begins at risk free rate & moves upwards towards the right.

*Risk averse investors choose to invest to the beginning of the line

*Risk seekers choose to the highest point.

ARBITRAGE PRICING MODEL

*Under CAPM expected return is calculated only on the basis of beta factor & is a single period model

***But APM identifies expected rate of return using the factors such as inflation rate,GDP rate,Interest on bond and other market interest rate**

Q.Co X & Y pay annual dividend of Rs 40to their shareholders and this is expected to continue. The risk free rate is 6% & current avg market rate of return is 10%.Beta of Co X is 1.1 and for Y is .8. What is the return & share price for each Co?

Ans:

$$R_i = R_f + \beta_i * (R_m - R_f)$$

Co x: R_i =6+1.1*(10-6)

=10.4%

Co y: R_i =6+.8(10-6)

=9.2%

$$\text{Share Price} = \frac{\text{Dividend}}{\text{Expected return}} * 100$$

$$\text{CoX} = \frac{40}{10.4} * 100$$

$$= \text{Rs}385$$

$$\text{Co Y} = \frac{40}{9.2} * 100$$

$$= \text{Rs } 435$$

Q.An investor would like to invest in a share and hold it for one year.The share is presently trading in the market for 43 but pays no dividends and there is an equal chance that the share will sell foe either Rs 55 or Rs 60 at the end of the year.What is the expected return & risk is 250 shares are bought with 80% borrowed funds.Assume the cost of borrowed funds to be 12%.Ignore commission & taxes

$$\text{Gross return} = \frac{\text{Amount invested} * \text{Expected return}}{100}$$

Net Return = Gross Return-Cost of Funds

$$\text{Gross Risk} = \frac{\text{Amount invested} * SD}{100}$$

Calculation of Probable return

Po=RS 43

P1=Rs 55

Rs 60

P =50:50

Year End Price	P1-Po	(P1-Po)/Po*100
55	55-43=12	27.91
60	60-43=17	39.53

Calculation Of Expected Return

Probable return(Xi)	Probability	XiPi
27.91	.5	13.955
39.53	.5	19.765
		$\bar{X}$=33.72

Calculation of Risk

Xi	P	$d(x-\bar{x})$	d^2	d^2*P
27.91	.5	-5.81	33.76	16.88
39.53	.5	5.81	33.76	16.88
				33.76

S.D=Square root Of 33.76

=5.81

Return & risk of buying 250 shares:

Investment in 250 Shares = 250*43

= 10750

***GROSS RETURN** = 10750*33.72/100=3624.90

Cost of Borrowed funds = 10750*80/100

= 8600*12/100

= 1032

***NET RETURN** =3624-1032

2592

***RISK** =10750*5.81/100

=624.58