Unit-1

Security is a tradeable financial instrument.

Risk of an investment depends on the extent of fluctuations and the relative probabilities.

Two parameters are used to asses an investment: riskiness and expected return.

Primarily driving force of an investment is the reward attached with it known as Returns, it is of two types revenue return i.e. interest or dividend and capital gains or loss

Risk is the variability in expected returns.

Returns

Return is total income generated by investment shown as a percentage of the cost of investment.

- Revenue Income
  - Regular
- Capital Income
  - At the end of investment period

$$\text{Return} = \frac{\text{Income from Investment} + (S/P - C/P)}{\text{Cost Price (C/P)}} \times 100$$

Income from Investment:
- It can be dividend in case of equity share
- Interest in case of Bond

In case of bond,

$$\text{Return} = \frac{\text{Interest} + (P_1 - P_0)}{P_0} \times 100$$

Interest Yield — Capital Appreciation

When comparing data over years average of return of all the years are taking to make a proper return.

$$\text{Average Return} = \frac{R_1 + R_2 + R_3 \dots R_N}{N}$$

It does not consider the effect of compounding also does not consider extreme values' effect on result.

Systematic risk is that risk which is caused by factors beyond the control of a specific company or individual.

Interest Rate Risk arises due to chays in market interest rate as increase in interest causes bond price to fall. It consists of 2 components price risk and reinvestment risk.

Price Risk means as interest increases bond at the current price and interest will be expensive so in order to make it lucrative it has to lower the price given that bond rate remains same.

Default risk is the risk that the investment value will become zero as bond issuer is unable to pay

Holding Period Return

Total Return ~~earned~~ earned during the complete holding period of the investment

$$H.P.R = \frac{\text{Total Income} + (\text{Sale Price} - \text{Cost Price})}{\text{Cost Price}} \times 100$$

Measurement of Risk

Risk is variability in expected returns and can be measured using variance or S.D.

$$S.D. = \sqrt{\text{variance}} = \sqrt{\Sigma(R_i - \bar{R})^2} \text{ or } \sqrt{\Sigma P_i (R_i - \bar{R})^2}$$

Most popular way to calculate total risk of a security.

There is a problem with S.D. that it is an absolute measure of return i.e. it gives overall return of market whereas co-efficient of variation should be used as it gives against a set benchmark.

$$\text{Co-efficient of Variation} = \frac{S.D}{\text{Mean Return}} = \frac{S.D}{\bar{R}}$$

Valuation Of Bonds

⇒ Present Value Of Bond

Intrinsic value of bond is the present value of all future expected cash flow from it.

So it consists of 2 components interest and redemption value which need to be converted into present value to be added

$$P_0 \text{ (Present/Intrinsic Value)} = I\,(PVFA) + RV\,(PVF)$$

I = Annual Interest Rate / Annual Payment / Coupon Rate
PVFA = Present Value Factor Annuity
RV = ~~Redemption value~~ / Future Value / Par value / Face value
PVF = Present Value Factor
K_d = discount rate of bond
Invest decision is based on this if
Intrinsic Value > Current Market Price, then buy

Semi Annually :

$$P_0 = \frac{I}{2}\left(PVFA_{\frac{K_d}{2},2N}\right) + \overset{FV}{\cancel{RV}}\left(PVF_{\frac{K_d}{2},2N}\right)$$

Quarterly :

$$P_0 = \frac{I}{4}\left(PVFA_{\frac{K_d}{4},4N}\right) + \overset{FV}{\cancel{RV}}\left(PVF_{\frac{K_d}{4},4N}\right)$$

Perpetual (no maturity period):

$$P_0 = \frac{\text{Annual Interest}}{K_d}$$

Types of Bond Yields

(i) Current Yield.

It is the yield which can be realised at the moment and changes with change in market price.

$$\text{Current Yield} = \frac{\text{Annual Interest}}{\text{Current Market Price}}$$

(ii) Yield to Maturity

It is popularly known as YTM, is the internal rate of return generated by bond.

It is the discount rate which equates the current market price of a bond with present value of cash inflows associated with bond.

$$YTM = \frac{\text{Coupon Payment} + \frac{FV - PV}{n}}{\frac{FV + PV}{2}}$$

It is the rate of return earned on a bond if purchased at current market price and held till maturity.

If YTM > RRR (required rate of return) then buy.

(iii) Yield To Call

YTC is the yield upto the time when call option can be exercised by the issuer company.

Same as YTM just we have call Price instead of FV and Time to call in case of n.

Present value of Nc

$$YTC = \frac{\text{Coupon Payment} + \frac{(C-P)}{N_c}}{\frac{C+P}{2}}$$

Risks in Bond

(i) Interest Rate Risk

A change in rate can cause change in bond price in opposite direction.

If market interest rate increases price of bond with fixed rate falls as new bonds with increased rate will be available

(ii) Default Risk

It is risk that borrower may not pay interest / principal on time. Also known as credit risk

Bond with higher default risk trade at higher YTM