4/12/18

Portfolio Management – An introduction

⇒ Meaning

Investment means deployment of funds in securities or asset issued by any financial institute with a view to obtain target returns over a specified time frame.

An investor invests in different class of financial asset depending upon the investor appetite

Eg:- Investment in Govt. Bonds offer risk free low returns maybe 6% to 8%. However if an investor invest in stock market, the expected rate of return would be more with risk component.

⇒ Economic Investments

The concept of economic investment means addition to the capital stock of the society. The capital stock of society is the goods which are used in production of other goods. The term investment implies the formation of new and productive capital in the form of new construction & producer durable goods such as plant & machinery, investories & human capital are also included in this group.

→ Financial investments.

This allocation of monetary resources to the asset that are expected to yield some gain or returns over given period of time. It includes shares, debentures, FD, NSC, Provident fund, life insurance policy etc. In their view investment is commitment of funds to derive future income in the form of dividend, interest, rent, premium, pension benefits and the appreciation of their principal capital.

→ Objectives of investment.

1) Safety.

2) Growth.

3) Income generation.

⇒ Elements of investment.

1) Asset allocation

2) long term approach

3) Diversification.

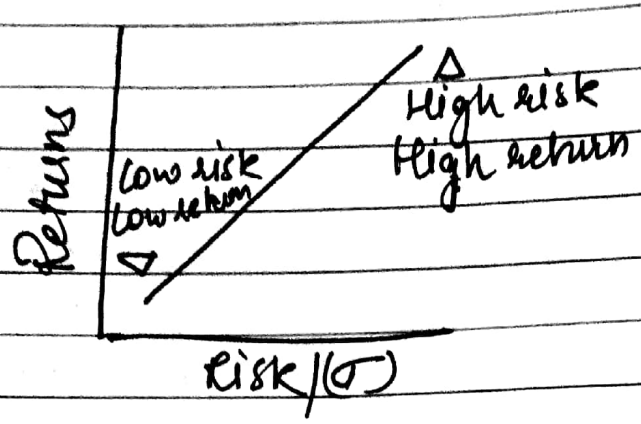
↳ Components of Portfolio Analysis.

1) Returns
2) Risk
3) Liquidity
4) Tax Benefit
5) Convenience
6) Safety
7) Growth
8) Marketability
9) Purchasing Power Stability.

⇒ Risk - Return Tradeoff

Higher risk is associated with greater probability of higher return and low risk with a greater probability of low returns. This trade off which an investor faces between risk & return while considering investment decisions is called as risk - return tradeoff. It also exists at portfolio level.

↳ Graphical Presentation.



Low risk are associated with low returns.
High risk are associated with high returns.

The risk-return trade off is an effort to achieve a balance b/w low risk & higher returns. The risk return trade of theory is graphically shown in the diagram. A higher standard deviation denotes high risk & low standard deviation denotes low risk.

⇒ PRACTICAL.

Q1 Given below are the returns incase of shares of Sun Ltd & Moon Ltd. in various economic conditions.

Economic condition	Probability	Sun Ltd	Moon Ltd
High Growth	0.3	15%	10%
Low growth	0.4	13%	11%
Stagnation	0.2	9%	12%
Recession	0.1	6%	14%

Calculate ERR.

Sol[n]

Economic condition	P	Sun Ltd.		Moon Ltd.	
		R	ER (PXR)	R	ER (PXR)
High growth	0.3	15	4.5	10	3
Low growth	0.4	13	5.2	11	4.4
Stagnation	0.2	9	1.8	12	2.4
Recession	0.1	6	0.6	14	1.4
			12.10		11.20

H.W
Q2 Mr. Ram wants to invest in company A and company B. The return on stock of A & B are given below with their probabilities.

Company A		Company B	
Returns	Probability	Returns	Probability
6	0.10	4	0.1
7	0.25	6	0.2
8	0.30	8	0.4
9	0.25	10	0.2
10	0.10	12	0.1

Sol[n]

Company A			Company B		
Return	Prob	ERR	Return	Prob	ERR
6	0.10	0.60	4	0.1	0.4
7	0.25	1.75	6	0.2	1.2
8	0.30	2.40	8	0.4	3.2
9	0.25	2.25	10	0.2	2.0
10	0.10	1.00	12	0.1	1.2
		8.00			8.0

$\sigma = \sqrt{18.19}$

$= 4.26\%$

Q4 The rate of return of stock A & stock B under different economic condition are given below:-

Economy	Prob	A	B
Boom	0.3	30%	70%
Normal	0.5	50%	50%
Recession	0.2	70%	30%

i) ~~to~~ ~~do~~ calculate ERR & S.D

ii) If you could invest in ~~stock~~ either stock A or B but not in both, which would you prefer.

Soln

Stock A

Economy	Prob	Returns	ERR	[R-ER]	$[R-ER]^2$	$P[R-ER]^2$
Boom	0.3	30	9	-18	~~1024~~ 324	97.2
Normal	0.5	50	25	+2	4	2
Recession	0.2	70	~~49~~	+22	484	96.8
			~~60~~ 48			195.6

$\sigma = \sqrt{195.6}$

$= 13.98\%$

Stock B.

Economy	Prob	Returns	EKR	[R-ER]	[R-ER]^2	P[R-ER]^2
Boom	0.3	70	21	18	324	97.2
Normal	0.5	80	25	-2	4	2
Recession	0.2	30	6	-22	484	96.8
			52			195.6

$\sigma = \sqrt{195.6}$

$= 13.98\%$

It is advisable to invest in stock B since the return is more than the risk.

Qs Volla Ltd. has been considering an investment in stocks. Bhosale Ltd & Ishan Ltd. She estimated following probability distribution of returns of Bhosale Ltd & Ishan Ltd.

Prob	Bhosale	Ishan
0.1	-10	5
0.25	0	10
0.4	10	15
0.2	20	20
0.05	30	25

Calculate ERR & SD for Both the stocks.

Q1

Bhosale Ltd.

Prob	R	ERR	[R-ER]	$[R-ER]^2$	$P[R-ER]^2$
0.1	-10	-1	-18.5	342.25	34.22
0.25	0	0	-8.5	72.25	18.06
0.4	10	4	1.5	2.25	0.9
0.2	20	4	11.5	132.25	26.45
0.05	30	1.5	21.5	462.25	23.11
		8.5			102.74

$\sigma = \sqrt{102.74}$

$= 10.13\%$

Ishan Ltd.

Prob	R	ERR	[R-ER]	$[R-ER]^2$	$P[R-ER]^2$
0.1	5	0.5	-9.25	85.56	8.57
0.25	10	2.5	-4.25	18.06	4.51
0.4	15	6	0.75	0.56	0.22
0.2	20	4	5.75	33.06	6.61
0.05	25	1.25	10.75	115.56	5.78
		14.25			25.69

$\sigma = \sqrt{25.69}$

$= 5.07\%$

Q10. Mr. Sushant wants to invest in foll. securities X & Y when expected price of shares is ₹150 & ₹180. under diff! economic conditions.

Economic Condition	Prob	X	Y
High	0.3	175	200
Low	0.2	190	210
Stagnation	0.2	140	190
Recession	0.3	160	175.

Sol^{n} ∴ Calculation of Return = $\frac{\text{Expected price} - \text{Present price}}{\text{Present price}} \times 100$

1) Securities X

High = $\frac{175 - 150}{150} \times 100 = 16.67$

Low = $\frac{190 - 150}{150} \times 100 = 26.67$

Stagnation = $\frac{140-180}{180} \times 100 = (6.67)$.

Recession = $\frac{160-150}{180} \times 100 = 6.67$

b) Securities Y.

High = $\frac{200-180}{180} \times 100 = 11.11$

Low = $\frac{210-180}{180} \times 100 = 16.67$

Stagnation = $\frac{190-180}{180} \times 100 = 5.56$

Recession = $\frac{175-180}{180} \times 100 = (2.78)$.

a) Security X

Prob	Return	ER	R-ER	$(R-ER)^2$	$P(R-ER)^2$
0.3	16.67	5.001	19.474	379.24	113.772
0.2	26.67	5.334	29.474	868.72	173.744
0.2	-6.67	-13.34	(3.866)	14.94	2.988
0.3	6.67	0.201	9.474	89.76	26.928
		(2.804)			317.43

$\sigma = \sqrt{317.43}$

$= 17.82\%$.

Q1 Mr. Rahul purchased 100 shares of Divya Ltd. for ₹3500 per share on 1st April 2014. Rahul sold all shares on 31st March 2017 for ₹5000 per share. During this tenure he received a normal dividend of ₹350 per share per year. Calculate the HPR.

Soln

1:- Purchase Price = ₹ 100 shares × ₹3500.
= 350000

2:- Sales = 100 shares × ₹5000.
= 500000.

3:- Capital Gain = SP - PP.
= 500000 - 350000.
= 150000.

4:- Dividend = 100 sh × ₹350 × 3yrs.
= ₹105000/-

5:- HPR = $\frac{\text{CG + Dividend}}{\text{Invst}} \times 100$

$= \frac{150000 + 105000}{350000} \times 100$

= 72.86%.

Annualised Return = $\frac{72.86}{3}$ = 24.29%.

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Portfolio Revision & Evaluation.

In order to determine risk adjusted returns of investment portfolios, several authors have worked since 1960's out of which 3 are widely performed.

1) Treynor Measure.
2) Sharpe Measure
3) Jensen Measure.

1) Treynor Measure :- $\frac{Ri - Rf}{\beta}$

Ri represents return on fund.
Rf represents risk free rate of return
β represents Beta.

2) Sharpe Measure :- $\frac{Ri - Rf}{\sigma / Si}$.

Ri represents returns on fund.
Rf represents risk free rate of return.
Si / (σ) represents standard deviation.

3) Jensen Measure.

$Rp = Rf + \beta(Rm - Rf)$.

Rm = Return of mkt.
Rf = Risk free rate of return.
Rp = Jensen.
β = Beta.

Q1 Compare the portfolio performance using sharpe & Treynor measure for the following portfolio.

Particulars	Avg Return	S.D	β
X	14	0.25	1.25
Y	10	0.15	1.10
Mkt index	12	0.25	1.20

The risk free rate of return is 8%.

Sol: i) Sharpe = $\frac{Ri - Rf}{\sigma}$

X = $\frac{14-8}{0.25}$	Y = $\frac{10-8}{0.15}$	Mkt = $\frac{12-8}{0.25}$
= 24%	= 13.33%	= 16%

ii) Treynor's Measure.

Treynor = $\frac{Ri - Rf}{\beta}$

X = $\frac{14-8}{1.25}$	Y = $\frac{10-8}{1.10}$	Mkt = $\frac{12-8}{1.20}$
= 4.8%	= 1.82%	= 3.33%

Q2 From the following info given in respect of Vandana MF co. & Vignesh Mkt index compute Sharpe & Treynor's Measure and Rank the MF.

MF	Ri	S.D	β
Shweta	12	18	1.1
Abhijit	10	15	0.9
Riya	13	20	1.2
Vignesh	14	17	1

$R_f = 6\%$

Sol^n i) Sharpe Measure $= \frac{Ri - Rf}{\sigma}$

Shweta $= \frac{12-6}{0.18} = 33.33\%$ II

Abhijit $= \frac{10-6}{0.15} = 26.67\%$ IV

Riya $= \frac{13-6}{0.20} = 35\%$ I

Vignesh $= \frac{11-6}{0.17} = 29.41\%$ III

ii) Treynor's Measure $= \frac{Ri - Rf}{\beta}$

Shweta $= \frac{12-6}{1.1} = 5.45\%$ II

Abhijit $= \frac{10-6}{0.9} = 4.4\%$ IV

Riya $= \frac{13-6}{1.2} = 5.83\%$ I

Vignesh $= \frac{11-6}{1} = 5\%$ III

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⇒ Bond valuation.

A bond is a debt instrument, it pays periodic interest based on coupon rate, interest & return the principle at the maturity. Bonds terms & conditions are mentioned in the contract b/w the buyer & the seller known as agreement / indenture.

⇒ Features of bond.

1) Face value

2) Coupon Rate.

3) Maturity.

4) Call provision :- Many bonds contain a provision that enables the issuers to buy the bond from the bond holder at pre-specified price prior to maturity. The price is known as call price. A bond containing a call provision is said to be callable.

5) Put provision :- Some bonds contain a provision that enables the buyer to sell back the bond to issuer at a pre-specified price prior to maturity. This price is known put price.

⇒ Sinking fund provisions.

Some bonds are issued with a provision & require the issuer to repurchase a fixed % of o/s bonds each year irrespective of the level of interest rate. It reduces the possibility of default.

⇒ Measuring Bond Returns.

i) YTM :- YTM on a bond is the rate of return that an investor would earn if its current MP and held the bond until the maturity. YTM is the unit discount rate at which the M.P of bond equals to P.V. of bonds cash flow.

ii) Yield to call :- Many bonds specially those issued by corporations are callable bonds. This means that issuer of bond can ~~be~~ redeem the bond prior to maturity by paying the call price which is greater than P.V of the bond to the bond holder. Often callable bonds cannot be called back until 5 or 10 years after they were issued. Yield to call is the rate of return that an investor would earn if ~~the~~ he bought a callable bond at its C.M.P and held it until the call date given that the bond was called on the call date.

5) Pricing Bonds :- A bond price equals to the present value of its expected future cash flow.

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→ Bond Pricing Theorem.

Burton G. Malkiel identify the relationship b/w bond price & changes in market interest rate. He stated 5 fundamental principles related to bond price & market interest rates which are known as bond pricing theorem.

→ Theorem 1 :- Bond prices & yield moves in opposite direction.

→ Theorem 2 :- Long term bonds have more interest rate risk rather than short term bonds.

→ Theorem 3 :- Higher coupon bonds have less interest rate risk.

→ Theorem 4 :- Bonds sensitivity to interest rate changes increases at a diminishing rate as its maturity grew.

→ Theorem 5 :- Capital gain from an interest rate decline exceeds the capital loss from an equivalent rate increase.

→ Bond Risk.

1) Interest Rate risk.
2) Reinvestment risk.
3) Inflation Risk.
4) Credit Risk.
5) Market Risk.
6) Selection Risk.
7) Timing risk
8) Call risk.
9) Liquiy risk
10) Event risk

⇒ Bond Duration.

Duration is a measure of weighted average life of a bond which considers the size and the timing of each cash flow. Duration is a measure of the effective maturity of a fixed income as opposed to actual maturity. Only those bonds which promise a single payment

to be received at maturity have duration equal to the actual years to maturity. ZCB are such bonds. For all others duration measures are ~~other~~ always less than their actual maturity.

⇒ Properties of Duration. [S.N.]

1) Duration of ZCB ~~bond~~ are same as maturity.

2) At a given maturity bond duration is higher when the coupon rate is low.

3) For a given coupon rate bonds duration generally increases with maturity.

4) Other things being equal, the duration of coupon bonds varies inversely with its YTM.

5) $\text{Duration} = \frac{\text{P.V of CIF}}{\text{Mkt value}} \times \text{Time}$.

Q 1. A bond of 1000 each has a coupon rate of 8% p.a. maturity period of 3 years is currently selling at 910/-. What is the YTM of bond.

Sol^n

$$\text{YTM} = \frac{I + \frac{FV - MV}{n}}{\frac{FV + MV}{2}} \times 100.$$

$$= \frac{80 + \left[\frac{1000 - 910}{3}\right]}{\frac{1000 + 910}{2}} \times 100$$

$$= \frac{80 + 30}{955} \times 100$$

$$= 11.52\%$$

Q2 A bond of ₹1000 each has a coupon rate of 10% at maturity period of 20 yrs. CMP is 1050. Find YTM.

$$YTM = \frac{I + \frac{FV - MV}{n}}{\frac{FV + MV}{2}} \times 100$$

$$= \frac{100 + \left[\frac{1000 - 1050}{2}\right]}{\frac{1000 + 1050}{2}} \times 100$$

$$= \frac{100 + [-2.5]}{1025} \times 100$$

$$= 9.51\%$$

Q3. Mr. A is considering investment in one of the following bonds. Bond X coupon rate 11% Maturity 10 years. Price par value ₹100. C.M.P is 76.

Bond Y coupon rate 12%. Maturity 7 yrs. Par value ₹100. CMP 69.

$$YTM = \frac{I + \frac{FV - PP}{n}}{\frac{FV + PP}{2}} \times 100$$

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Unit 3:- Fundamental Analysis.

→ Fundamental analysis is the method of evaluating a security. It attempts to measure intrinsic value of security by examining economic factors, financial factors and other qualitative & quantitative factors. Fundamental Analyst study the effect of macro & micro factors on the security.

⇒ Formulaes:-

A] Liquidity Ratio

1) Current Ratio = $\frac{CA}{CL}$.

2) Quick Ratio = $\frac{QA}{QL}$ (Quick Asset) / (Quick Liabilities).

3) Absolute liquid ratio = $\frac{\text{Absolute Liquid Asset}}{\text{Current Liabilities}}$
(Cash, Bank, Short term securities)

B] Profitability Ratios.

1) GP Ratio = $\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$.

2) Operating cost Ratio = $\frac{\text{Operating cost}}{\text{Net Sales}} \times 100$.

3) Operating Profit Ratio = $\frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$

4) Net Profit Ratio = $\frac{\text{PBT}}{\text{Net sales}} \times 100$

OR

$= \frac{\text{PAT}}{\text{Net sales}} \times 100$

5) Return on Capital Employed / Return on Investment

$= \frac{\text{EBIT}}{\text{CE}} \times 100$

6) EPS (Earning Per Share) = $\frac{\text{PAT} - \text{Pref. Dividend}}{\text{No. of eq. shares.}}$

7) Dividend Payout Ratio = $\frac{\text{DPS}}{\text{EPS}} \times 100$

8) Dividend Yield Ratio = $\frac{\text{DPS}}{\text{MPS}}$

9) P/E Ratio = Price Earning Ratio

$= \frac{\text{MPS}}{\text{EPS}} \times 100$

10) Net profit to Net worth ratio = $\frac{\text{PAT}}{\text{Shareholders fund}} \times 100$

11) Preference Dividend cover = $\frac{PAT}{Pref.Dividend.}$

12) Equity Dividend Cover = $\frac{PAT - Pref.Div}{Equity\ Dividend.}$

C] Working capital Ratio.

1) Stock Turnover Ratio = $\frac{COGS}{Avg\ stock.}$

2) Debtors Turnover Ratio = $\frac{Credit\ sales}{Avg\ Drs + Avg\ Bills\ Rec}$

3) Debt collection period = $\frac{Avg\ Drs + Avg\ Bills\ Rec \times 12/2}{Credit\ Sales}$

4) Creditors Turnover Ratio = $\frac{Credit\ Purchase}{Avg\ Crs + Avg\ Bills\ Pay.}$

5) Avg Payment period = $\frac{Avg\ Crs + Avg\ Bills\ Pay \times 12/6}{Credit\ Purchase}$

6) Working Cap T/O ratio = $\frac{Sales}{Working\ Cap.}$

7) Fixed asset T/O ratio = $\frac{Sales}{Fixed\ Asset}$

8) Capital T/O ratio = $\frac{\text{Sales}}{\text{C.E}}$

D] Capital structure Ratios.

1) Debt Equity Ratio = $\frac{\text{Debt}}{\text{Equity}}$.

2) Proprietary ratio = $\frac{\text{Proprietors funds}}{\text{Total Asset}} \times 100$.

3) Capital Gearing ratio = $\frac{\text{LF} + \text{Pref. cap.}}{\text{OF} + \text{Pref cap.}}$

4) Debt Service Ratio = $\frac{\text{EBIT}}{\text{Interest}}$