SFM

STRATEGIC FINANCIAL MANAGEMENT

By CA. Gaurav Jain

PORTFOLIO MANAGEMENT SUMMARY

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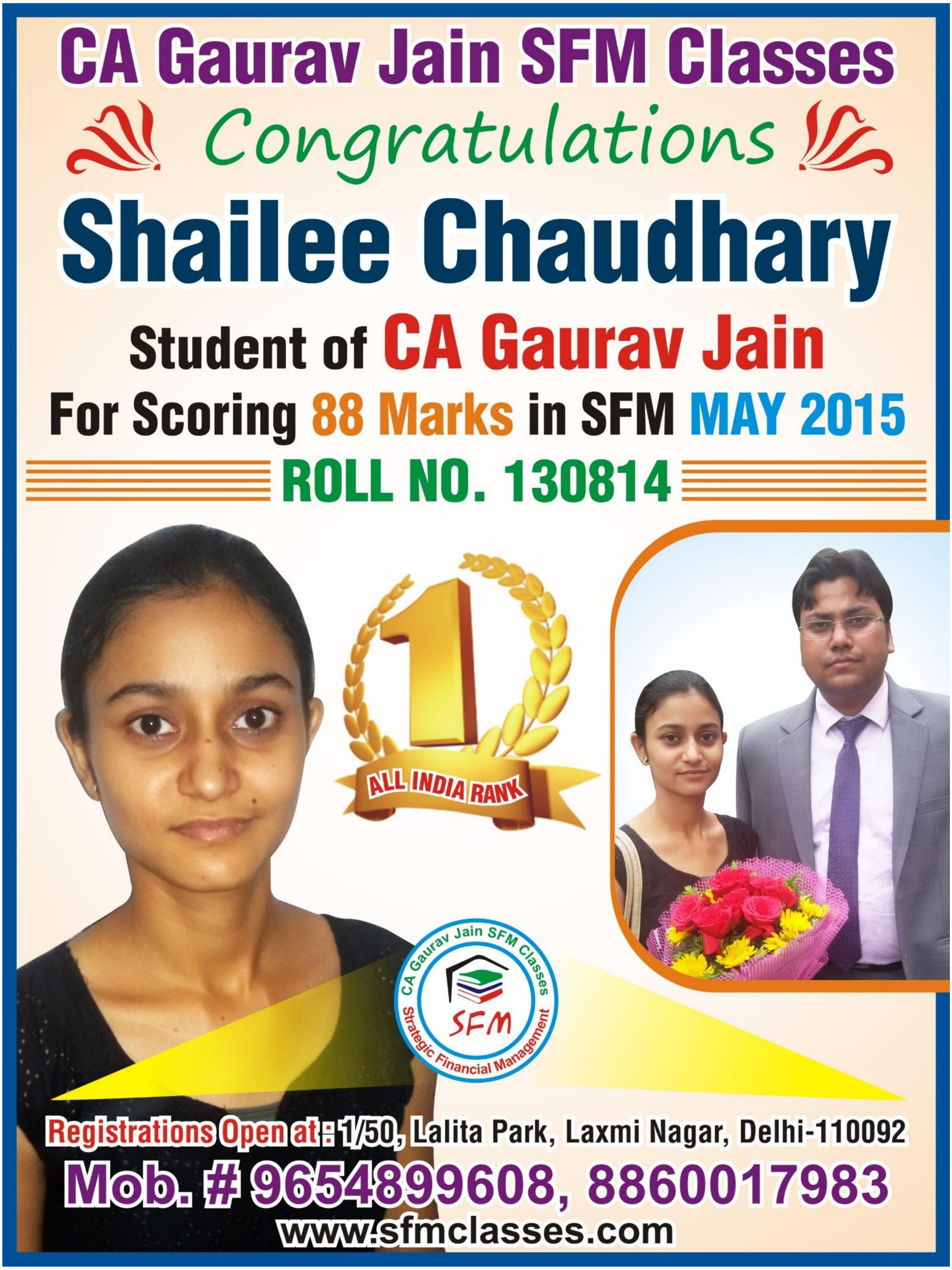
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BATCH 1

BATCH	STARTING DATE	COMPLETION DATE	SCHEDULE	TIMING	FEES
Morning	17th Feb. 2016	2nd Week of April 2016	Daily	6.30 a.m. To 10.30 a.m.	Rs. 13,000/-

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NOV - 2014

Keshav Goel

Scoring 83 Marks in SFM

(All India 18th Rank)

Roll No. 132485

Nov. 2014

Anish Gupta
Roll No. 188172
For Scoring 68 Marks in SFM
(All India 22nd Rank)

May 2014

Pravesh Khandelwal
Roll No. 125761
For Scoring 85 Marks in SFM
(All India 2nd Highest)

Nov. 2013

Nishant Gupta
Roll No. 162871
For Scoring 77 Marks in SFM
(All India Rank 17th Rank)

Nov. 2014	Marks	Roll No.
NIKHIL DANGRI	73	122733
DIVYA GOEL	72	137546
BIKASH THAKUR	72	128998
NITISH JAIN	72	127328
SAGAR ARORA	70	123653
SHWETA BANGER	69	129045
ASIF	69	128643
KAPIL MANCHANDA	68	181015
TIKAM CHAND	68	114487

May 2014	Marks	Roll No.
CHAVI AGARWAL	73	123341
ABHILASHA GUPTA	72	127225
ANISH MUNJAL	70	121546
MUDHI GOEL	70	121971
AYUSHI AGARWAL	69	133383

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Some Average Students who scored Extra Ordinary Marks in SFM

NAME	MARKS	ROLL NO.
ANKUR AHUJA	81	118704
PRAVEEN KR. BANSAL	79	124614
SHUBHAM BANSAL	77	126553
VIPUL KOHLI	76	119771
SAMYAK JAIN	75	117279
SANYA BHUTANI	71	121320
MOHAN	70	120201
NAMAN JAIN	70	123182
ALOK JAIN	70	175378
PREETI GUPTA	70	120727
NISHANT BHARDWAJ	68	115218
SUMIT CHOPRA	65	121871
AMIT CHAWLA	65	145682
TARUN MEHROTRA	64	121080
RATAN BHADURIA	63	126331
ANAND KHANKANI	63	128791

Mark sheet of our Student – Pravesh Kumar

Final Examination Result

ROLL Number	**125761**
Name	**PRAVESH KUMAR**
Group I	
Financial Reporting	040
Strategic Financial Management	**085**
Advanced Auditing and Professional Ethics	048
Corporate and Allied Laws	056
Total	**229**
Result	**PASS**
Grand Total	**229**

Mark sheet of our Student - Ankur Ahuja

Final Examination Result

ROLL Number	**118704**
Name	**ANKUR AHUJA**
Group I	
Financial Reporting	046
Strategic Financial Management	**081**
Advanced Auditing and Professional Ethics	040
Corporate and Allied Laws	066
Total	**233**
Result	**PASS**
Grand Total	**233**

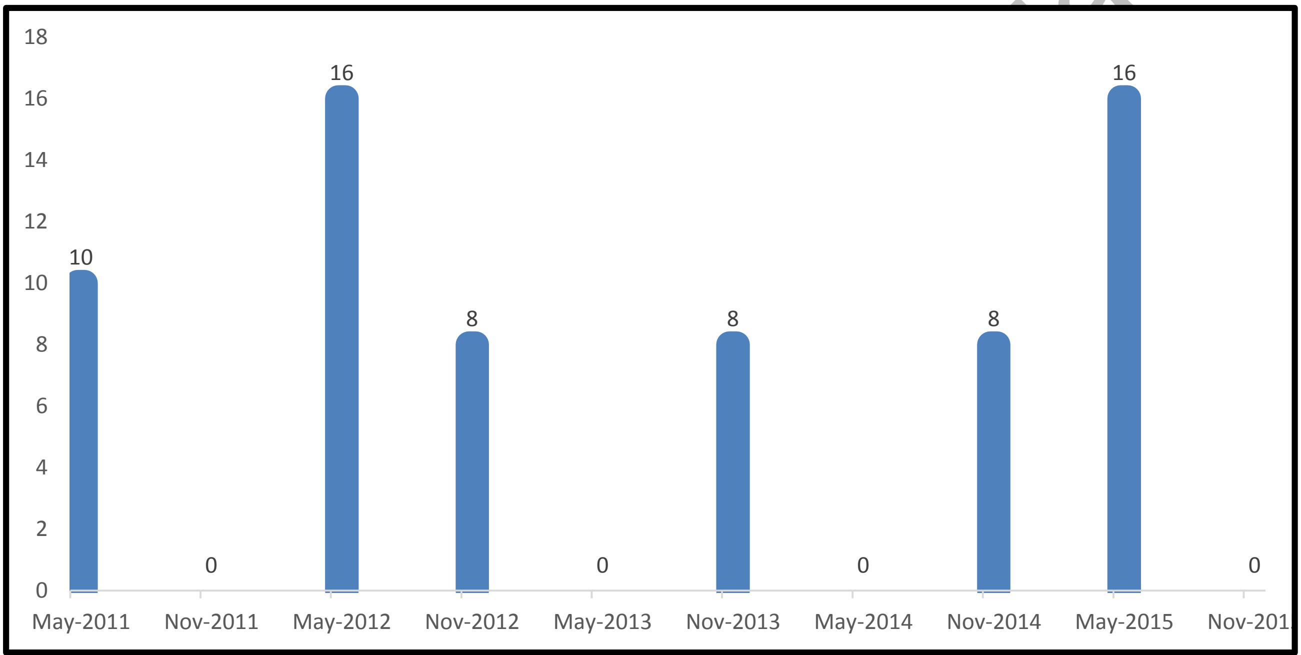
Mark sheet of our Student – Vipul Kohli

Final Examination Result

ROLL Number	**119771**
Name	**VIPUL KOHLI**
Group I	
Financial Reporting	052
Strategic Financial Management	**076**
Advanced Auditing and Professional Ethics	046
Corporate and Allied Laws	043
Total	**217**
Result	**PASS**
Group II	
Advanced Management Accounting	051
Information Systems Control and Audit	041
Direct Tax Laws	045
Indirect Tax Laws	046
Total	**183**
Result	**PASS**
Grand Total	**400<**

Portfolio Management

Attempt wise Marks Analysis of Chapter



Attempts	Marks
May-2011	10
Nov-2011	0
May-2012	16
Nov-2012	8
May-2013	0
Nov-2013	8
May-2014	0
Nov-2014	8
May-2015	16
Nov-2015	0

Concept No. 1: Introduction

- **Portfolio** means combination of various underlying assets like bonds, shares, commodities, etc.
- **Portfolio Management** refers to the process of selection of a bundle of securities with an objective of maximization of return & minimization of risk.

Steps in Portfolio Management Process

- Planning
- Execution
- Feedback

Concept No. 2: Major return Measures

(i) **Holding Period Return (HPR)** :-

HPR is simply the percentage increase in the value of an investment over a given time period.

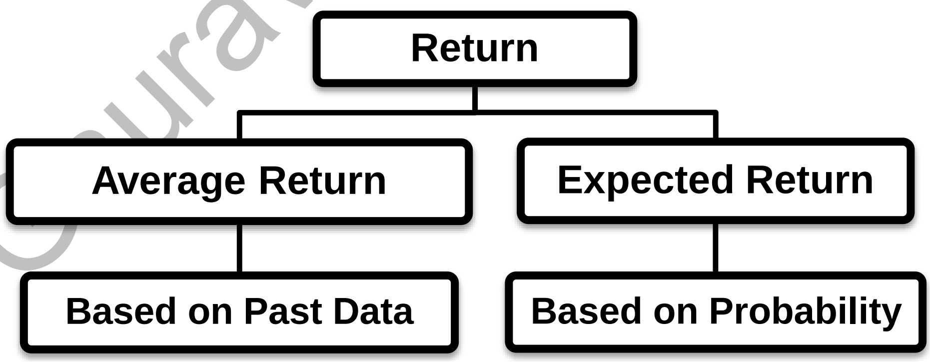
$$\textbf{HPR} = \frac{\text{Price at the end} - \text{price at the beggining} + \text{Dividend}}{\text{price at the beggining}}$$

(ii) **Arithmetic Mean Return** :-

It is the simple average of a series of periodic returns.

$$= \frac{R_1 + R_2 + R_3 + R_4 + \cdots + R_n}{n}$$

Concept No. 3: Calculation of Return of an individual security



1. **Average Return :-**

Step 1: Calculate HPR for different years, if it is not directly given in the Question.

Step 2: Calculate Average Return i.e. $\frac{\sum X}{n}$

2. **Expected Return (Expected Value):-**

$$\textbf{E(x)} = \sum P_{Xi} X_i = P_{X1}X_1 + P_{X2}X_2 + P_{X3}X_3 + \cdots + P_{Xn}X_n$$

Concept No. 4: Calculation of Risk of an individual security

Risk of an individual security will cover under following heads:

1. **Standard Deviation of Security (S.D)** :- (S.D) or σ (sigma) is a measure of total risk / investment risk.

Standard Deviation

- **Based on Past Data**
- **Based on Probability**

Based on Past Data:-

Formula

$$(\sigma) = \sqrt{\frac{\sum(X-\overline{X})^2}{n}}$$

Note: For sample data, we may use (n-1) instead of n in some cases.

x = Given Data
$\overline{x}$ = Average Return
n = No. of events/year

Note: $\sum(X - \overline{X})$ will always be Zero

Based on Probability:-

$$\text{S.D } (\sigma) = \sqrt{\sum \text{probability}(X - \overline{X})^2}$$

Where $\overline{x}$ = Expected Return

Note:

- $\sum(X - \overline{X})$ may or may not be Zero in this case.
- S.D can never be negative. It can be zero or greater than zero.
- S.D of risk-free securities or government securities or U.S treasury securities is always assumed to be zero unless, otherwise specified in question.

Decision:

Higher the S.D, Higher the risk and vice versa.

2. Variance

Based on Past Data:-

$$\boxed{\text{Variance} = (\text{S.D})^2 = (\sigma)^2}$$

$$\text{Variance} = \frac{\sum(X-\bar{X})^2}{n}$$

Based on Probability:-

$$\textbf{Variance} = \sum \text{probability}(X - \bar{X})^2$$

Decision:
Higher the Variance, Higher the risk and vice versa.

3. Co-efficient of Variation (CV) :-

CV is used to measure the risk (variable) per unit of expected return (mean)

Formula:

$$\boxed{CV = \frac{\text{Standard Deviation of X}}{\text{Average/Expected value of X}}}$$

Decision:
Higher the C.V, Higher the risk and vice versa.

Concept No. 5: Rules of Dominance in case of an individual Security or when two securities are given

Rule No. 1:

	X Ltd.	Y Ltd
σ	5	5
Return	10	15

Decision:- Select Y. Ltd.

- **For a given 2 securities, given same S.D or Risk, select that security which gives higher return**.

Rule No. 2:

	X Ltd.	Y Ltd
σ	5	10
Return	15	15

Decision:- Select X. Ltd.

- **For a given 2 securities, given same return, select which is having lower risk in comparison to other.**

Rule No. 3:

	X Ltd.	Y Ltd
σ	5	10
Return	10	25

Decision:- Based on CV (Co-efficient of Variation).

- **When Risk and return are different, decision is based on CV**.

$CV_x = 5/10 = 0.50$ $CV_y = 10/25 = 0.40$

Decision:- Select Y. Ltd.

<u>Concept No. 6: Calculation of Return of a Portfolio of assets</u>

- It is the weighted average return of the individual assets/securities.

Portfolio Return

Based on Past Data

R_P or R_{A+B} = Avg. $\text{Return}_A \times W_A$ + Avg. $\text{Return}_B \times W_B$

Based on Probability

R_P or R_{A+B} = Expected $\text{Return}_A \times W_A$ + Expected $\text{Return}_B \times W_B$

Where, $W_i = \dfrac{\text{Market Value of investments in asset}}{\text{Market Value of the Portfolio}}$

- Sum of the weights must always =1

i.e. $W_A + W_B = 1$

<u>Concept No. 7: Risk of a Portfolio of Assets</u>

Standard Deviation of a Two-Asset Portfolio

$$\sigma_{1,2} = \sqrt{\sigma_1^2 w_1^2 + \sigma_2^2 w_2^2 + 2\sigma_1 w_1 \sigma_2 w_2 r_{1,2}}$$

where
$r_{1,2}$ = Co-efficient of Co-relation; σ_1 = S.D of Security 1; σ_2 = S.D of Security 2;
w_1 = Weight of Security 1; w_2 = Weight of Security 2

1) Co-efficient of Correlation

$$r_{1,2} = \frac{Cov_{1,2}}{\sigma_1 \sigma_2}$$

Or

$$Cov_{1,2} = r_{1,2}\,\sigma_1\,\sigma_2$$

- The correlation co-efficient has no units. It is a pure measure of co-movement of the two stock's return and is bounded by -1 and +1.

2) Co-Variance

Co-Variance

- **Based on Past Data**

$$Cov_{X,Y} = \frac{\sum(X-\bar{X})(Y-\bar{Y})}{n}$$

- **Based on Probability**

$$Cov_{X,Y} = \sum Prob.(X-\bar{X})(Y-\bar{Y})$$

Note:

Co-Variance or Co-efficient of Co-relation between risk-free security & risky security will always be zero.

<u>Concept No. 8: Portfolio risk as Correlation varies</u>

Note:

- The portfolio risk falls as the correlation between the asset's return decreases.
- The lower the correlation of assets return, the greater the risk reduction (diversification) benefit of combining assets in a portfolio.
- If assets return when perfectly negatively correlated, portfolio risk could be minimum.

Portfolio Diversification refers to the strategy of reducing risk by combining many different types of assets into a portfolio. Portfolio risk falls as more assets are added to the portfolio because not all assets prices move in the same direction at the same time. Therefore, portfolio diversification is affected by the:

1. *Correlation between assets:* Lower correlation means greater diversification benefits.
2. *Number of assets included in the portfolio:* More assets means greater diversification benefits.

Concept No. 9: Standard-deviation of a 3-asset Portfolio

$$\sigma_{1,2,3} = \sqrt{\sigma_1^2 W_1^2 + \sigma_2^2 W_2^2 + \sigma_3^2 W_3^2 + 2\,\sigma_1\sigma_2 W_1 W_2\, r_{1,2} + 2\,\sigma_1\sigma_3\, W_1 W_3 r_{1,3} + 2\,\sigma_2\sigma_3 W_2 W_3\, r_{2,3}}$$

Or

$$\sigma_{1,2,3} = \sqrt{\sigma_1^2 W_1^2 + \sigma_2^2 W_2^2 + \sigma_3^2 W_3^2 + 2\, W_1 W_2 Cov_{1,2} + 2\, W_1 W_3 Cov_{1,3} + 2\, W_2 W_3 Cov_{2,3}}$$

Portfolio consisting of 4 securities

$$\sigma_{1,2,3,4} = \sqrt{\begin{array}{l}\sigma_1^2 W_1^2 + \sigma_2^2 W_2^2 + \sigma_3^2 W_3^2 + \sigma_4^2 W_4^2 + 2\,\sigma_1\sigma_2 W_1 W_2\, r_{1,2} + 2\,\sigma_2\sigma_3 W_2 W_3\, r_{2,3} + \\ 2\,\sigma_3\sigma_4\, W_3 W_4 r_{3,4} + 2\,\sigma_4\sigma_1\, W_4 W_1 r_{4,1} + 2\,\sigma_2\sigma_4\, W_2 W_4 r_{2,4} + 2\,\sigma_1\sigma_3\, W_1 W_3 r_{1,3}\end{array}}$$

Concept No. 10: Standard Deviation of Portfolio consisting of Risk-free security & Risky Security

We know that S.D of Risk-free security is ZERO.

$$\sigma_{A,B} = \sqrt{\sigma_A^2 w_A^2 + \sigma_B^2 w_B^2 + 2\sigma_A w_A \sigma_B w_B r_{A,B}}$$

$$= \sqrt{\sigma_A^2 w_A^2 + 0 + 0}$$

$$= \sigma_A W_A$$

Concept No. 11: Calculation of Portfolio risk and return using Risk-free securities and Market Securities

- Under this we will construct a portfolio using risk-free securities and market securities.

Case 1: Investment 100% in risk-free (RF) & 0% in Market

Risk = 0% [S.D of risk free security is always 0(Zero).]

Return = risk-free return

Case 2: Investment 0% in risk-free (RF) & 100% in Market

Risk = σ_m

Return = R_m

Case 3: Invest part of the money in Market & part of the money in Risk-free

$$\textbf{Return} = R_m W_m + R_F W_{Rf}$$

$$\textbf{Risk of the portfolio} = \sigma_m \times W_m \ (\sigma \text{ of } R_F = 0)$$

Case 4: Invest more than 100% in market portfolio. Addition amount should be borrowed at risk-free rate.

Let the additional amount borrowed weight = x

$$\textbf{Return of Portfolio} = R_m \times (1+x) - R_F \times x$$

$$\textbf{Risk of Portfolio} = \sigma_m \times (1+x)$$

Concept No. 12: Optimum Weights

For Risk minimization, we will calculate optimum weights.

Formula :

$$W_A = \frac{\sigma_B^2 - \text{Covariance (A,B)}}{\sigma_A^2 + \sigma_B^2 - 2\times \text{Covariance (A,B)}}$$

$$W_B = 1 - W_A \ (\text{Since } W_A + W_B = 1)$$

We know that

Covariance (A,B) = $r_{A,B} \times \sigma_A \times \sigma_B$

Note:

- When r = -1 i.e. two stocks are perfectly (-) correlated, minimum risk portfolio become risk-free portfolio.

$$W_A = \frac{\sigma_B}{\sigma_A + \sigma_B}$$

Concept No. 13: CAPM (Capital Asset Pricing Model)

For Individual Security:

The relationship between Beta (Systematic Risk) and expected return is known as CAPM.

Required return/ Expected Return

$$= \text{Risk-free Return} + \frac{\text{Beta security}}{\text{Beta Market}} (\text{Return Market} - \text{Risk free return})$$

OR

$$= R_F + \beta_s (R_m - R_F)$$

Note:

- **Market Beta is always assumed to be 1.**
- Market Beta is a benchmark against which we can compare beta for different securities and portfolio.
- **Standard Deviation & Beta of risk free security is assumed to be Zero (0) unless otherwise stated.**

- $R_m - R_F$ = Market Risk Premium.
- If Return Market (R_m) is missing in equation, it can be calculated through HPR (Holding Period Return)
- R_m is always calculated on the total basis taking all the securities available in the market.
- Security Risk Premium = $\beta (R_m - R_F)$

For Portfolio of Securities:

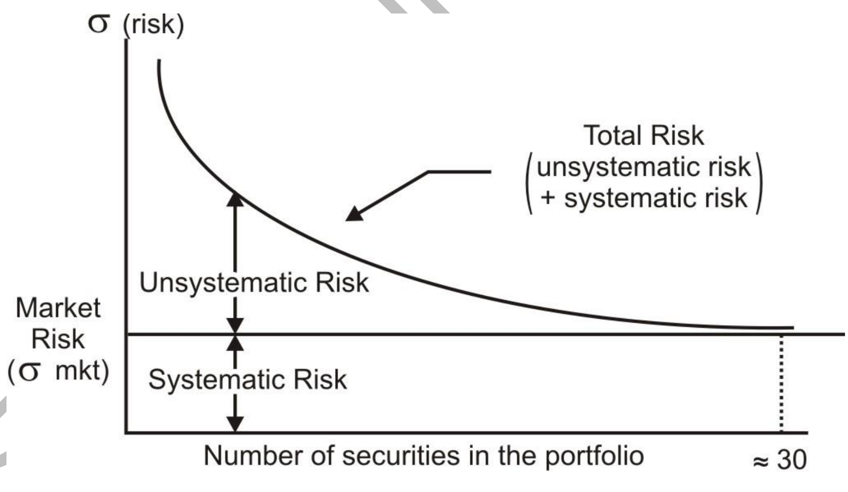
$$\textbf{Required return/ Expected Return} = R_F + \beta_{Portfolio} (R_m - R_F)$$

Concept No. 14: Decision Based on CAPM

Case	Decision	Strategy
Estimated Return/ HPR < CAPM Return	Over-Valued	Sell
Estimated Return/ HPR > CAPM Return	Under-Valued	Buy
Estimated Return/ HPR = CAPM Return	Correctly Valued	Buy, Sell or Ignore

- CAPM return need to be calculated by formula, RF + β (R m – RF)
- Actual return / Estimated return can be calculated through HPR

Concept No. 15: Systematic Risk, Unsystematic risk & Total Risk



Total Risk (σ) = Systematic Risk (β) + Unsystematic Risk

Unsystematic Risk (Controllable Risk):-

- The risk that is eliminated by diversification is called Unsystematic Risk (also called unique, firm-specific risk or diversified risk). They can be controlled by the management of entity.

E.g. Strikes, Change in management, etc.

Systematic Risk (Uncontrollable Risk):-

- The risk that remains can't be diversified away is called systematic risk (also called market risk or non-diversifiable risk). This risk affects all companies operating in the market.

- They are beyond the control of management. E.g. Interest rate, Inflation, Taxation, Credit Policy

Concept No. 16: Interpret Beta/ Beta co-efficient / Market sensitivity Index

- The sensitivity of an asset's return to the return on the market index in the context of market return is referred to as its Beta.

Calculation of Beta

1. **Beta Calculation with % change Formulae**

$$\text{Beta} = \frac{\textbf{Change in Security Return}}{\textbf{Change in Market Return}}$$

Note:

- This equation is normally applicable when two return data is given.
- In case more than two returns figure are given, we apply other formulas.

2. **Beta of a security with co-variance Formulae**

$$\text{Beta} = \frac{\textbf{Co−Variance of Asset's return with Market Return}}{\textbf{Variance of Market Return}}$$

$$= \frac{\text{COV}_{\text{i.m}}}{\sigma_m^2}$$

3. **Beta of a security with Correlation Formulae**

We know that Correlation Co-efficient (r_{im}) = $\frac{\text{COV}_{\text{i.m}}}{\sigma_i \sigma_m}$

to get Cov $_{im}$ = $r_{im}\, \sigma_i \sigma_m$

Substitute Cov $_{im}$ in β equation, We get $\beta_i = \frac{r_{im}\sigma_i\sigma_m}{\sigma_m^2}$

$$\boldsymbol{\beta = r_{im} \frac{\sigma_i}{\sigma_m}}$$

Concept No. 17: Beta of a portfolio

It is the weighted average beta of individual security.

Formula:

$$\textbf{Beta of Portfolio} = \text{Beta}_{\text{X Ltd.}} \times W_{\text{X Ltd.}} + \text{Beta}_{\text{Y Ltd.}} \times W_{\text{Y Ltd.}}$$

Where, $W_i = \frac{\text{Market Value of investments in asset}}{\text{Market Value of the Portfolio}}$

Concept No. 18: Arbitrage Pricing Theory/ Stephen Ross's Apt Model

Overall Return

= Risk free Return + {Beta Inflation × Inflation differential or factor risk Premium}

+

{Beta GNP × GNP differential or Factor Risk Premium}

……. & So on.

Where, Differential or Factor risk Premium = [Actual Values – Expected Values]

Concept No. 19: Evaluation of the performance of a portfolio (Also used in Mutual Fund)

1. **Sharpe's Ratio (Reward to Variability Ratio)**:

- It is excess return over risk-free return per unit of total portfolio risk.
- Higher Sharpe Ratio indicates better risk-adjusted portfolio performance.

Formula:

$$\frac{R_P - R_F}{\sigma_P}$$

Where R_P = Return Portfolio
σ_P = S.D of Portfolio

Note:

- Sharpe Ratio is useful when Standard Deviation is an appropriate measure of Risk.
- The value of the Sharpe Ratio is only useful for comparison with the Sharpe Ratio of another Portfolio.

2. **Treynor's Ratio (Reward to Volatility Ratio):**

- Excess return over risk-free return per unit of Systematic Risk (β)

Formula:

$$\frac{R_P - R_F}{\beta_P}$$

Decision: Higher the ratio, Better the performance.

3. **Jenson's Measure/Alpha:**

- This is the difference between a fund's actual return & CAPM return

Formula:

$$\alpha_P = R_P - (R_F + \beta (R_m - R_F))$$

Or

Alpha = Actual Return – CAPM Return

It is excess return over CAPM return.

- If Alpha is +ve, performance is better.
- If Alpha is -ve , performance is not better.

4. Market Risk - return trade – off:

- Excess return of market over risk-free return per unit of total market risk.

Formula:

$$\frac{R_M - R_F}{\sigma_M}$$

Decision: Higher is better.

Concept No. 20: When two risk-free returns are given

We are taking the Average of two Rates.

Concept No. 21: Effect of Increase & Decrease in Inflation Rates

Increase in Inflation Rates:

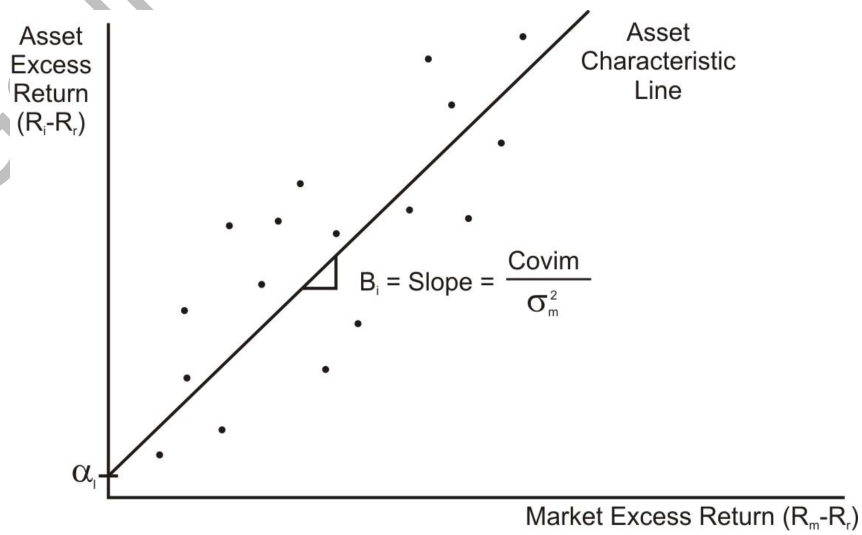
Revised R_F = R_F + Increased Rate
Revised R_M = R_M + Increased Rate

Decrease in Inflation Rates:

Revised R_F = R_F - Decreased Rate
Revised R_M = R_M - Decreased Rate

Concept No. 22: Characteristic Line (CL)

Characteristic Line represents the relationship between Asset excess return and Market Excess return.



Equation of Characteristic Line:

$$Y = \alpha + \beta x$$

Where Y = Average return of Security
x = Average Return of Market
α = Intercept i.e. expected return of an security when the return from the market portfolio is ZERO, which can be calculated as **Y – β × X = α**
b = Beta of Security

Note:

The slope of a Characteristic Line is $\frac{COV_{i,M}}{\sigma^2_M}$ i.e. Beta

Concept No. 23: New Formula for Co-Variance using Beta

New Formula for Co-Variance between 2 Stocks ($Cov_{A,B}$) = $\beta_A \times \beta_B \times \sigma^2_m$

Concept No. 24: Co-variance of an Asset with itself is its Variance

$$\textbf{Cov}_{(m,m)} = \textbf{Variance}_m$$

Co-variance Matrix

In Co-variance matrix, we present the co-variance among various securities with each other.

Return Covariance	A	B	C
A	xxx	xxx	xxx
B	xxx	xxx	xxx
C	xxx	xxx	xxx

Concept No. 25: Sharpe Index Model or Calculation of Systematic Risk (SR) & Unsystematic Risk (USR)

- Risk is expressed in terms of variance.

Total Risk (TR) = Systematic Risk (SR) + Unsystematic Risk (USR)

For an Individual Security:

Total Risk = σ_s^2

Systematic Risk (%)

SR = $\beta_s^2 \times \sigma_m^2$

Unsystematic Risk (%)
σ_{ei}^2

USR = TR - SR
= $\sigma_s^2 - \beta_s^2 \times \sigma_m^2$

σ_{ei}^2 = USR/ Standard Error/ Random Error/ Error Term/ Residual Variance.

For A Portfolio of Securities:

Total Risk = σ_P^2
or
$= (\sum W_i \beta_i)^2 \times \sigma^2_m + \sum W_i^2 \times USR_i$

Systematic Risk (%)

$SR = \beta_P^2 \times \sigma_m^2$

$(\sum W_i \beta_i)^2 \times \sigma^2_m$

Unsystematic Risk (%)

$USR = TR - SR$
$= \sigma_P^2 - \beta_P^2 \times \sigma_m^2$

$\sum W_i^2 \times USR_i$

Concept No. 26: Co-efficient of Determination

- Co-efficient of Determination = (Co-efficient of co-relation) ^{2}
  $= r^2$
- Co-efficient of determination (r^2) gives the percentage of variation in the security's return i.e. explained by the variation of the market index return.

Example:

If $r^2 = 18\%$

- In the X Company's stock return, 18% of the variation is explained by the variation of the index and 82% is not explained by the index.

- According to Sharpe, the variance explained by the index is the systematic risk. The unexplained variance or the residual variance is the Unsystematic Risk.

Use of Co-efficient of Determination in Calculating Systematic Risk & Unsystematic Risk:

1. **Explained by Index [Systematic Risk]**
   = Variance of Security Return × Co-efficient of Determination of Security
   i.e. $\sigma_1^2 \times r^2$
2. **Not Explained by Index [Unsystematic Risk]**
   = Variance of Security Return × (1 - Co-efficient of Determination of Security)
   i.e. $\sigma_1^2 \times (1 - r^2)$

Concept No. 27: Portfolio Rebalancing

- Portfolio re-balancing means balancing the value of portfolio according to the market condition.

➢ **Three policy of portfolio rebalancing**:

(a) Buy & Hold Policy : [“Do Nothing” Policy]

(b) Constant Mix Policy: [“Do Something” Policy]

(c) Constant Proportion Portfolio Insurance Policy (CPPI): [“Do Something” Policy]

Value of Equity (Stock) = m × [Portfolio Value – Floor Value], Where m = multiplier

➢ The performance feature of the three policies may be summed up as follows:

(a) Buy and Hold Policy

(ii) Gives rise to a straight line pay off.
(iii) Provides a definite downside protection.
(iv) Performance between Constant mix policy and CPPI policy.

(a) Constant Mix Policy

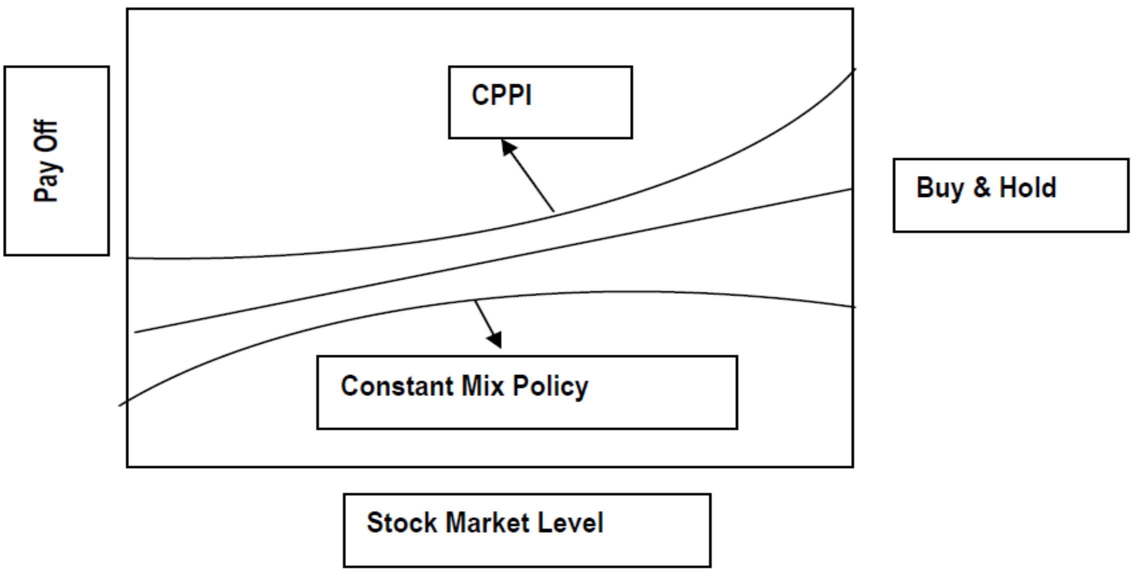
(i) Gives rise to concave pay off drive.
(ii) Doesn’t provide much downward protection and tends to do relatively poor in the up market.
(ii) Tends to do very well in flat but fluctuating market.

(a) CPPI Policy

(i) Gives rise to a convex pay off drive.
(ii) Provides good downside protection and performance well in up market.
(iii) Tends to do very poorly in flat but in fluctuating market.

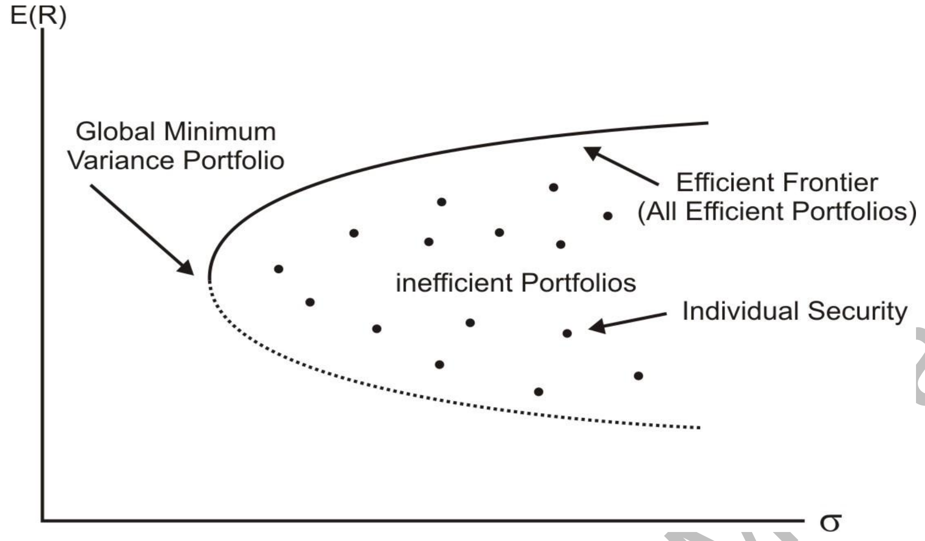
Note:

❖ If Stock market moves only in one direction, then the best policy is CPPI policy and worst policy is Constant Mix Policy and between lies buy & hold policy.
❖ If Stock market is fluctuating, constant mix policy sums to be superior to other policies.



Concept No. 28: Modern Portfolio Theory/ Markowitz Portfolio Theory/ Rule of Dominance in case of selection of more than two securities

Under this theory, we will select the best portfolio with the help of efficient frontier.



Efficient Frontier:

- Those portfolios that have the greatest expected return for each level of risk make up the efficient frontier.
- All portfolios which lie on efficient frontier are efficient portfolios.

Efficient Portfolios:

Rule 1: Those Portfolios having same risk but given higher return.

Rule 2: Those Portfolios having same return but having lower risk.

Rule 3: Those Portfolios having lower risk and also given higher returns.

Rule 4: Those Portfolios undertaking higher risk and also given higher return

In-efficient Portfolios:
Which don't lie on efficient frontier.

Solution Criteria:

For selection of best portfolio out of the efficient portfolios, we must consider the risk-return preference of an individual investor.

- If investors want to take risk, invest in the Upper End of efficient frontier portfolios.
- If investors don't want to take risk, invest in the Lower End of efficient frontier portfolios.

Concept No. 29: Capital Market Line (CML)

The line of possible portfolio risk and Return combinations given the risk-free rate and the risk and return of a portfolio of risky assets is referred to as the Capital Allocation Line.

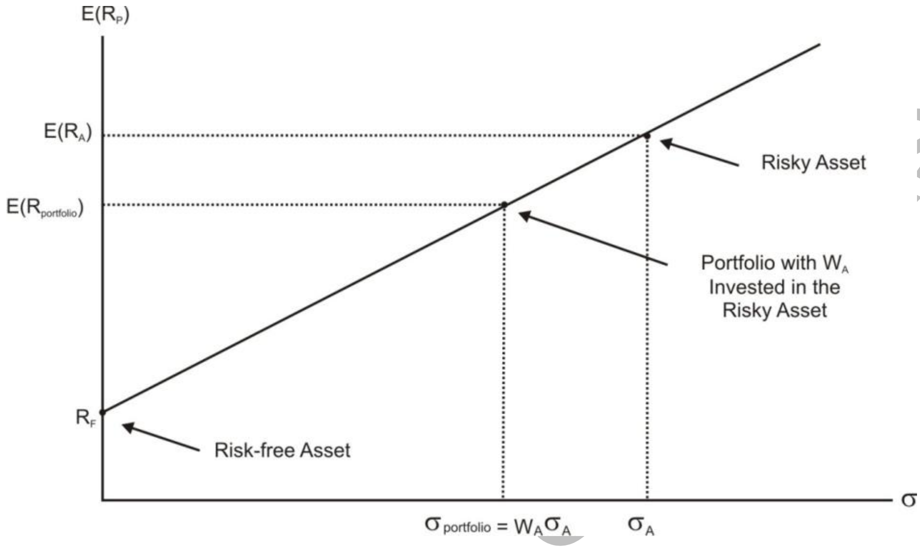
- Under the assumption of homogenous expectations (Maximum Return & Minimum Risk), the optimal CAL for investors is termed the Capital Market Line (CML).

- CML reflect the relationship between the expected return & total risk (σ).

Equation of this line:-

$$\mathbf{E(R_p) = R_F + \frac{\sigma_p}{\sigma_m}\,[E(R_M) - R_F]}$$

Where $[E(R_M) - R_F]$ is Market Risk Premium



Concept No. 30: SML (Security Market Line)

- SML reflects the relationship between expected return and systematic risk (β)

Equation:

$$\mathbf{E(R_i) = RFR + \underbrace{\frac{COV_{i,Market}}{\sigma^2_{market}}}_{\text{Beta}}\,[E(R_{Market}) - RFR]}$$

- If Beta = 0

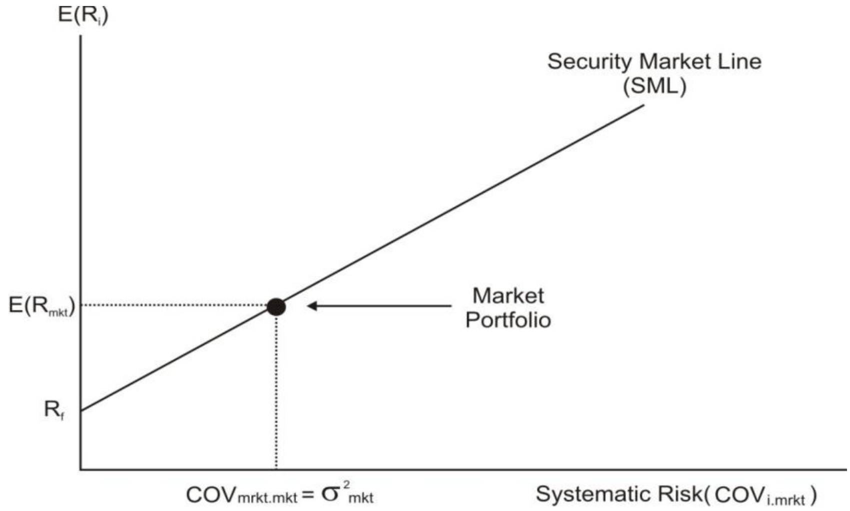
CAPM Return = $R_f + \beta (R_m - R_f)$
= R_f

- If Beta = 1

$E(R) = R_f + \beta (R_m - R_f)$
$= R_f + R_m - R_f$
$= R_m$

Graphical representation of CAPM is SML.

- According to CAPM, all securities and portfolios, diversified or not, will plot on the SML in equilibrium.



Concept No. 31: Cut-Off Point or Sharpe's Optimal Portfolio

Calculate Cut-Off point for determining the optimum portfolio

Steps Involved

Step 1: Calculate Excess Return over Risk Free per unit of Beta i.e. $\frac{R_i - R_f}{\beta_i}$

Step 2: Rank them from highest to lowest.
Step 3: Calculate Optimal Cut-off Rate for each security.

Cut-off Point of each Security

$$C_i = \frac{\sigma_m^2 \sum_{i=1}^{N} \frac{(R_i - R_f \times \beta)}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{i=1}^{N} \frac{\beta_i^2}{\sigma_{ei}^2}}$$

Step 4: The Highest Cut-Off Rate is known as "Cut-off Point". Select the securities which lies on or above cut-off point.
Step 5: Calculate weights of selected securities in optimum portfolio.

(a) Calculate Z_i of Selected Security

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2}\left[\frac{(R_i - R_f)}{\beta_i} - \text{Cut off Point}\right]$$

(b) Calculate weight percentage

$$W_i = \frac{Z_i}{\sum Z}$$