| | TIME VALUE OF MONEY |
|---|---|
| 1 | Nominal interest rate = real risk-free rate + expected inflation rate |
| 2 | Required interest rate on security = nominal risk-free rate + default risk premium + liquidity premium + maturity risk premium |
| 3 | Effective Annual Return (EAR) = EAR = $(1 + \text{periodic rate})^m - 1$<br>Periodic rate = stated annual rate/m<br>M = number of compounding periods per year |
| 4 | $FV = PV(1 + I/Y)^N$<br>$PV = \frac{FV}{\left(1 + \frac{I}{Y}\right)^N}$<br>FV = future value<br>PV = Present value<br>I/Y = Rate of return per compounding period<br>N = Number of compounding periods |
| 5 | PV perpetuity $= \frac{PMT}{(I/Y)}$<br>PMT = Fixed periodic cash flow |
| | **DISCOUNTED CASH FLOW APPLICATION** |
| 6 | $NPV = \sum \frac{CF}{(1+r)^t}$<br>CF = Expected cash flow<br>r = Discount rate |
| 7 | IRR<br>$0 = CF + \frac{CF1}{(1+IRR)} + \frac{CF2}{(1+IRR)^2} + \frac{CF3}{(1+IRR)^3}$<br>IRR = Internal rate of return. |
| 8 | $HPR = \frac{(\text{Ending Value} - \text{Beginning Value})}{(\text{Beginning Value})}$<br>HPR = Holding period return |
| 9 | RBD = D/F*360/t<br>RBD = Annualised yield on a bank discount basis<br>D = Dollar discount = purchase price - face value<br>F = Face value<br>t = Number of days until maturity<br>360 = Bank convention of number of days in a year |
| 10 | Effective Annual Yield (EAY) = $(1 + HPY)^{365/t} - 1$<br>HPY = Holding period yield |

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|---|---|
| 11 | RMM= 360/days*HPY<br>RMM=Money market yield |
| 12 | Bond equivalent yield= $\{(1+\text{effective annual yield})^{1/2}-1\} * 2$ |
| 13 | Geometric Mean= $[(1+R1)(1+R2)\ldots.(1+Rn)]^{1/n}-1$<br>Geometric mean return is also known as compound annual rate of return |
| 14 | Harmonic Mean= $\frac{N}{\sum(1/x)}$ |
| 15 | Position of observation at a given percentile<br>Ly=(n+1) $\frac{y}{100}$ |
| 16 | Range= Maximum Value- Minimum Value |
| 17 | Mean Absolute Deviation (MAD)= $\frac{(\sum Xi-X)}{n}$<br>X=Arithmetic mean |
| 18 | Population Variance<br>$\sigma^2 = \frac{(\Sigma(Xi-\mu)^2)}{N}$ |
| 19 | Standard Deviation<br>$\sigma$ = square root of variance |
| 20 | Sample Variance<br>$\sigma^2 = \frac{(\Sigma(Xi-\mu)^2)}{N-1}$ |
| 21 | Chebyshev's Inequality<br>Percentage of observations that lie within k standard deviations of the mean is at least= $1-1/k^2$ |
| 22 | Coefficient of Variation<br>CV= $\frac{\text{(standard deviation of x)}}{\text{(average value of x)}}$ |
| 23 | Sharpe Ratio= $\frac{(Rp-RFR)}{\sigma p}$<br>Rp= Portfolio Return<br>RFR= Risk Free Rate<br>$\sigma$p= standard deviation of portfolio return |
| 24 | Sample Skewness (Sk) = $\frac{(\sum(Xi-x)^3)}{s^3}$<br>s =sample standard deviation |
| 25 | Sample Skewness (Sk) = $\frac{(\sum(Xi-x)^4)}{s^4}$ |
| 26 | Excess Kurtosis= Sample Kurtosis - 3 |

| | PROBABILITY CONCEPTS |
|---|---|
| 27 | Multiplication Rule Of Probability,<br>P(AB)=P(A/B)*P(B) |
| 28 | Addition Rule Of Probability,<br>P(A or B)= P(A)+P(B)-P(AB) |
| 29 | Total Probability Rule (Used to determine unconditional probability of an event)<br>P(A)=P(A/B1)P(B1)+P(A/B2)P(B2)+……+P(A/BN)P(BN) |
| 30 | Expected value of random variable= weighted average of possible outcomes,<br>Weights = probabilities that the outcome will occur |
| 31 | Covariance<br>Cov(Ri, Rj)= E{[Ri-E(Ri)][(Rj-E(Rj)]}<br>Cov(Ri, Rj)= Corr(Ri, Rj) σ(Ri)σ(Rj) |
| 32 | Correlation Cofficient<br>$Corr(Ri,Rj) = \frac{(Cov(Ri,Rj))}{(\sigma(Ri)\sigma(Rj))}$ |
| 33 | Weight of asset in portfolio,<br>w= market value of investment in asset i/market value of the portfolio |
| 34 | Portfolio Expected Value<br>E(Rp)=w1E(R1) + w2E(R2)+…… wnE(Rn) |
| 35 | Variance of 2 Asset Portfolio |
| 36 | Variance of 3 asset Portfolio |
| 37 | Bayes Formula,<br>Updated Probability=( Probability of new information for a given event / unconditional probability of new event )*(prior probability of event) |
| 38 | Factorial<br>n! = n*(n-1)*(n-2)*(n-3)…… *1<br>0!=1 |
| 39 | Labelling,<br>n! / (n1!)*(n2!)*…. ( nn!) |
| 40 | Combination,<br>n Cr=n! /(n-r)!r! |
| 41 | Permutation,<br>n! /(n-r)! |
| | **COMMON PROBABILITY DISTRIBUTIONS** |
| 42 | To standardize a normal variable,<br>$z = \frac{(Observation - Population\ Mean)}{(Standard\ Deviation)}$ |

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| 43 | Roy's safety first criteria,<br>$SFR = \frac{([E(Rp)-Rl])}{(\sigma p)}$<br>**Choose the portfolio with largest SFR |
| 44 | Continuously compounded rate of return,<br>Rcc=ln(1+HPR) |
| | **SAMPLING AND ESTIMATION** |
| 45 | Standard Error of sample Mean,<br>$\sigma x = \sigma/\sqrt{n}$<br>$\sigma$= Standard deviation of population<br>n=Size of the sample |
| 46 | t-distribution to construct a confidence interval,<br>When variance is unknown,<br>$x = t_{\alpha/2} * s/\sqrt{n}$<br><br>When variance is known,<br>$x = t_{\alpha/2} * \sigma/\sqrt{n}$<br>x= Point estimate of population mean<br>$t_{\alpha/2}$=The t-reliability factor<br>$s/\sqrt{n}$=Standard error of sample mean |
| | **SAMPLING AND ESTIMATION** |
| 47 | $\text{Test Statistic} = \frac{(\text{Sample Mean - Hypothesized Mean})}{(\text{Standard Error of Sample Mean})}$ |
| 48 | t-statistic<br>When population variance is unknown,<br>$Tn\text{-}1 = \frac{(x-\mu)}{(s/\sqrt{n})}$<br>When population variance is known,<br>$Tn\text{-}1 = \frac{(x-\mu)}{(\sigma/\sqrt{n})}$ |
| 49 | Chi-square test: $X2 = \frac{(n-1)s2}{\sigma 2}$ |
| 50 | F-distribution test,<br>F=s12/s22 |
| | **TECHNICAL ANALYSIS** |
| 51 | Arms Index or Short Term Trading Index,<br>$TRIN = \frac{(\text{Number of advancing Issues / Number of declining issues})}{(\text{Volume of advancing issues / Volume of declining issues})}$ |

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| | **DEMAND AND SUPPLY ANALYSIS: INTRODUCTION** |
| 52 | Demand function for good X,<br>Qdx=f(Px,I,Py,….)<br>Px=Price of good X, I=Some measure of average income per year,<br>Py=Prices of related goods |
| 53 | Price Elasticity of Demand= %ΔQuantity Demanded/ %ΔPrice<br>Δ=change |
| 54 | Cross Price Elasticity= %ΔQuantity Demanded/%ΔPrice Of Related Goods<br>Δ=change |
| 55 | Income Elasticity=%ΔQuantity Demanded/%Δ in Income<br>Δ=change |
| | **DEMAND AND SUPPLY ANALYSIS: THE FIRM** |
| 56 | Accounting profit=total revenue-total accounting costs |
| 57 | Economic profit=accounting profit-implicit opportunity costs<br>Or<br>Economic profit=total revenue-total economic costs |
| 58 | Normal profit,<br>Economic profit=accounting profit-normal profit=0<br>Normal profit is the accounting profit that makes economic profit equal to zero |
| 59 | Marginal Cost,<br>MC=change in total cost/change in output |
| | **AGGREGATE OUTPUT, PRICES AND ECONOMIC GROWTH** |
| 60 | Nominal GDP=$\sum$Pi,tQi,t<br>Pi,t= Price of good i in year t. Qi,t=Quantity of good I produced in year t |
| 61 | GDP deflator= (nominal GDP/value of year t output at year t)*100 |
| 62 | Per Capita Real GDP= GDP/population |
| 63 | GDP by expenditure approach,<br>GDP= C+I+G+(X-M)<br>C=Consumption spending, I=Business investment, G=Government purchases, X=Exports, M=Imports |
| 64 | GDP by Income Approach,<br>GDP=national income+ capital consumption allowance+ statistical discrepancy |
| 65 | National Income= compensation of employees (wages and benefits)<br>+ corporate and government enterprise profits before taxes<br>+Interest Income<br>+Unincorporated business net income (business owner's income)<br>+rent<br>+indirect business taxes-subsidies |

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| 66 | Personal Income= national Income<br>+transfer payments to households<br>-indirect business taxes<br>-corporate income taxes<br>-undistributed corporate profits |
| 67 | Personal disposable income=personal income-personal taxes |
| 68 | Quantity Theory Of Money,<br>MV=PY<br>M=Money Supply,<br>V=Velocity of money in transactions,<br>P=Price level<br>Y=Real GDP |
| 69 | Recessionary Gap or Output Gap=Real GDP-Full Employment GDP |
| 70 | Potential GDP=aggregate hours worked*labour productivity<br>In terms of economic growth,<br>Growth in potential GDP=growth in labour force+ growth in labour productivity |
| 71 | Production Function,<br>Y=A*f(L,K)<br>Y=Aggregate economic output,<br>L=Size of labour force,<br>K=Amount of capital available,<br>A=Total factor productivity |
| | **UNDERSTANDING BUSINESS CYCLES** |
| 72 | CPI= (Cost of basket at current prices/cost of basket at base period prices)*100 |
| 73 | Total amount of money that can be created,<br>Money created= new deposit/reserve requirement |
| 74 | Money Multiplier=1/Reserve Requirement |
| 75 | Fisher Effect,<br>Rnom=Rreal+E(I)+RP<br>Rnom=Nominal interest rate,<br>Rreal=Real Interest rate<br>RP=Risk premium for uncertainty |
| 76 | Neutral Interest Rate= Real trend rate of economic growth + inflation target |
| 77 | Fiscal Multiplier= 1/[1-MPC(1-t)] |
| 78 | Relation between trade deficit, saving and domestic investment,<br>Exports-imports= private savings+ government savings+ domestic investment |
| | **CURRENCY EXCHANGE RATES** |
| 79 | Real Exchange Rate= Nominal Exchange Rate(d/f)* $\frac{\text{(CPI foreign)}}{\text{(CPI domestic)}}$ |

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| 80 | Interest Rate Parity,<br>$\frac{\text{foward}}{\text{spot}} = \frac{(1+\text{interest rate (domestic)}}{(1+\text{interest rate (foreign)}}$ |
| | **FINANCIAL STATEMENT ANALYSIS: AN INTRODUCTION** |
| 81 | Accounting Equation, (Balance Sheet)<br>Assets= liabilities + equity<br>Assets=liabilities+ contributed capital+ ending retained earnings<br>Assets=liabilities+ contributed capital+ beginning retained earnings+ revenue-expenses-dividends |
| 82 | Income statement equation,<br>Net income=revenues-expenses |
| 83 | Straight line depreciation expense= $\frac{(\text{cost-residual value})}{(\text{useful life})}$ |
| 84 | Accelerated depreciation- double declining balance method<br>DDB depreciation= $\left(\frac{2}{\text{useful life}}\right)$(cost-accumulated depreciation) |
| 85 | Basic EPS= $\frac{(\text{net income-preferred dividends})}{(\text{weighted average number of common shares outstanding})}$ |
| 86 | Diluted EPS= $\frac{(\text{Adjusted income for common shareholders})}{(\text{weighted average commom and potential common shares outstanding})}$<br>Diluted EPS= $\frac{([\text{Net income-preferred dividends}]+[\text{convertible preferred dividends}]+[\text{convertible debt interest}](1\text{-tax rate}))}{([\text{Weighted average shares}]+[\text{shares from conversion of converted preferred shares}]+[\text{shares from conversion of debt}]+[\text{shares issuable from stock options}])}$ |
| | **UNDERSTANDING CASHFLOW STATEMENTS** |
| 87 | Free Cash flow to firm,<br>FCFF= NI+ NCC+ Interest(1-Tax Rate) –FC Inv-WC Inv<br>FCFF=CFO+ Interest(1-Tax Rate)-FC Inv<br>NI= Net income<br>NCC= Non cash charges<br>FC Inv= Fixed capital investment<br>WC Inv= Working Capital Investment |
| 88 | Free cash flow to equity,<br>FCFE=CFO-FC Inv + net borrowing<br>Net borrowing= debt issued- debt repaid |

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| 89 | Performance Ratio:<br>Cash flow to revenue= CFO/Net Revenue<br>CFO= Cash flow from operations |
| 90 | Performance Ratio:<br>Cash return on asset ratio= CFO/Average total assets |
| 91 | Performance Ratio:<br>Cash return on equity ratio=CFO/Average total equity |
| 92 | Performance Ratio:<br>Cash to income ratio: CFO/Operating Income |
| 93 | Cash flow per share= $\frac{\text{(CFO-Preferred Dividends)}}{\text{(Weighted Average Number Of Common Shares)}}$ |
| 94 | Coverage Ratio:<br>Debt coverage= $\frac{\text{CFO}}{\text{(Total Debt)}}$ |
| 95 | Coverage Ratio:<br>Interest coverage ratio: $\frac{\text{(CFO+interest paid+taxes paid)}}{\text{(interest paid)}}$<br>If interest paid is classified as a financing activity under ifrs, no interest adjustment is necessary |
| 96 | Reinvestment Ratio= $\frac{\text{CFO}}{\text{(Cash paid for long term assets)}}$ |
| 97 | Debt payment Ratio= $\frac{\text{CFCFO}}{\text{(Cash long term debt repayment)}}$ |
| 98 | Dividend Payment Ratio= $\frac{\text{CFO}}{\text{(Dividends paid)}}$ |
| 99 | Investing and Financing Ratio= $\frac{\text{CFO}}{\text{(Cash outflow from investing and financing activities)}}$ |
| | **FINANCIAL ANALYSIS TECHNIQUES** |
| | **ACTIVITY RATIOS:** |
| 100 | Receivables Turnover=net annual sales /average receivables |
| 101 | Days of sales outstanding= $\frac{365}{\text{(Receivables turnover)}}$ |
| 102 | Inventory Turnover= $\frac{\text{(Cost of goods sold)}}{\text{(Average inventory)}}$ |
| 103 | Days of inventory in hand= $\frac{365}{\text{(Inventory turnover)}}$ |

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| 104 | Payables turnover = $\frac{\text{Purchases}}{\text{(Average trade payables)}}$ |
| 105 | Number of days of payables = $\frac{365}{\text{(Payable turnover)}}$ |
| 106 | Total asset turnover = $\frac{\text{(Revenue )}}{\text{(Average total assets)}}$ |
| 107 | Fixed asset turnover = $\frac{\text{Revenue}}{\text{(Average net fixed assets)}}$ |
| 108 | Working capital turnover = $\frac{\text{Revenue}}{\text{(Average working capital)}}$ |
| | **LIQUIDITY RATIOS** |
| 109 | Current Ratios = $\frac{\text{(Current Assets)}}{\text{(Current Liabilities)}}$ |
| 110 | Quick Ratio = $\frac{\text{(Cash + Marketable Securities + Receivables)}}{\text{(Current Liabilities)}}$ |
| 111 | Cash Ratio = $\frac{\text{(Cash + Marketable Securities)}}{\text{(Current Liabilities)}}$ |
| 112 | Defensive Interval = $\frac{\text{(Cash + Marketable Securities + Receivables)}}{\text{(Average Daily Expenditures)}}$ |
| 113 | Cash Conversion Cycle = (Days sales outstanding) + (days on inventory on hand) - (number of days of payables) |
| | **SOLVENCY RATIOS** |
| 114 | Debt to equity ratio = $\frac{\text{(Total debt)}}{\text{(Total Shareholders Equity)}}$ |
| 115 | Debt To Capital = $\frac{\text{(Total debt)}}{\text{(Total Debt + Total Shareholders Equity)}}$ |
| 116 | Debt To Assets = $\frac{\text{(Total Debt)}}{\text{(Total Assets)}}$ |
| 117 | Financial Leverage = $\frac{\text{(Average Total Assets)}}{\text{(Average Total Equity)}}$ |
| 118 | Interest Coverage Ratio = $\frac{\text{(Earnings Before Interest and taxes)}}{\text{(Interest payments)}}$ |
| 119 | Fixed Charge Coverage = $\frac{\text{(Earnings Before Interest \& Taxes + Lease Payments)}}{\text{(Interest payments + Lease payments)}}$ |

| | PROFITABILITY RATIOS |
|---|---|
| 120 | Net profit margin = $\frac{\text{(Net Income)}}{\text{Revenue}}$<br>Net income = earnings after taxes but before dividends |
| 121 | Gross Profit Margin = $\frac{\text{(Gross profit)}}{\text{Revenue}}$<br>Gross profit = Net Sales - COGS |
| 122 | Operating profit margin = $\frac{\text{(Operating Income (EBIT))}}{\text{Revenue}}$ |
| 123 | Pretax margin = $\frac{\text{EBT}}{\text{Revenue}}$ |
| 124 | Return on assets (ROA) = $\frac{\text{(Net Income)}}{\text{(Average Total Assets)}}$ |
| 125 | Operating return on assets = $\frac{\text{(Operating Income)}}{\text{(Average Total Assets)}}$ |
| 126 | Return on Total Capital = $\frac{\text{EBIT}}{\text{(Average Total Capital)}}$ |
| 127 | Return On Equity = $\frac{\text{(Net Income)}}{\text{(Average Total Equity)}}$<br>Or<br>Return On Equity = $\frac{\text{(Net Income)}}{\text{Revenue}} * \frac{\text{Revenue}}{\text{Equity}}$<br>= Net Profit Margin * Equity Turnover<br><br>Return On Equity By Du Pont Equation,<br>Return On Equity = $\frac{\text{(Net Income)}}{\text{Sales}} * \frac{\text{(Sales )}}{\text{Assets}} * \frac{\text{(Assets)}}{\text{Equity}}$<br>=Net Profit Margin*Asset Turnover*Leverage Ratio<br><br>ROE By Extended Dupont Equation,<br>ROE = $\frac{\text{(Net Income)}}{\text{EBT}} * \frac{\text{EBT}}{\text{EBIT}} * \frac{\text{EBIT}}{\text{Revenue}} * \frac{\text{Revenue}}{\text{(Total Assets)}} * \frac{\text{(Total Assets )}}{\text{(Total Equity)}}$<br>=Tax Burden *Interest Burden*EBIT Margin*Asset turnover*financial leverage |
| 128 | Return on common equity = $\frac{\text{(Net Income-Preferred Dividends)}}{\text{(Average Common Equity)}}$ |
| 129 | Sustainable growth rate = RR*ROE<br>RR = Retention rate<br>=1-dividend payout |

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| 130 | Coefficient of variation sales $= \frac{\text{(Standard deviation of operating income)}}{\text{(Mean sales)}}$ |
| 131 | CV Operating Income $= \frac{\text{(Standard deviation of operating income)}}{\text{(mean operating income)}}$ |
| 132 | CV Net Income $= \frac{\text{(Standard deviation of net income)}}{\text{(Mean net income)}}$ |
| | **INVENTORIES** |
| 133 | COGS = beginning inventory + purchases - ending inventory |
| | **LONG LIVED ASSETS** |
| 134 | Depreciation methods,<br>i) straight line and ii) ddb covered earlier.<br>Ii) units of production depreciation =<br>$\frac{\text{(Original cost-salvage value)}}{\text{(life in output units)}} * \text{Output units in the period}$ |
| | **INCOME TAXES** |
| 135 | Effective tax rate $= \frac{\text{(Income tax expense)}}{\text{(Pretax income)}}$ |
| 136 | Income tax expense = taxes payable + ΔDTL-ΔDTA<br>DTL = Deferred tax liability<br>DTA = Deferred tax asset |
| | **CAPITAL BUDGETING** |
| 137 | Profitability Index (PI) $= \frac{\text{(PV Of future cash flows)}}{\text{CF0}}$<br>$= 1 + \frac{\text{NPV}}{\text{CF0}}$ |
| | **COST OF CAPITAL** |
| 138 | WACC = (wd)[kd(1-t)] + (wps)(kps) + (wcc)(Kcc)<br>Wd = percentage of debt in capital structure.<br>Wps = percentage of preferred stock in the capital structure.<br>Wcc = percentage of common stock in the capital structure |
| 139 | After tax cost of debt = kd(1-t) |
| 140 | Cost of preferred stock ($k_{ps}$)<br>$K_{ps} = D_{ps}/p$ |

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| 141 | Capital asset pricing model (CAPM)<br>Kce=RFR+β[E(Rm)-RFR]<br>Kce=Cost of equity capital<br>RFR= Risk free rate<br>E(Rm)= Expected return on market. |
| 142 | Dividend discount model,<br>$Po = \frac{D1}{(k-g)}$<br>D1= Next year dividend.<br>K=Required rate of return on common equity.<br>g = Firm's expected constant growth rate. |
| 143 | Bond yield plus risk premium approach,<br>$K_{ce}$=bond yield + risk premium |
| 144 | Asset Beta,<br>$B_{Asset} = \beta_{Equity}^{\frac{1}{1+\frac{(1-t)D}{E}}}$<br>D/E= Comparable company's debt to equity ratio |
| 145 | Project Beta,<br>$B_{Project} = \beta_{Asset}\ (1+(1-t)\frac{D}{E})$ |
| 146 | Revised CAPM using country risk premium,<br>$K_{ce}$=Rf+β[E($R_m$)-RFR+CRP<br>CRP= Country risk premium |
| 147 | $CRP = \frac{\text{(Annualised standard deviation of equity index of developing country)}}{\text{(Annualised standard deviation of sovereign bond Market in terms of the developed market currency)}}$<br>Sovereign yield spread= difference between the yields of government bonds in in the developing country and treasury bonds of similar maturities |
| 148 | Break Point (any time the cost of one of the components of the company's WACC changes.)<br>$\text{Break Points} = \frac{\text{(Amount Of Capital at which the components cost of capital changes)}}{\text{(weight of the he component in the capital structure)}}$ |

| | MEASURES OF LEVERAGE |
|---|---|
| 149 | Degree of operating leverage,<br>$DOL = \frac{\text{(Percentage change in EBIT)}}{\text{(Percentage change in sales)}}$<br>DOL for a particular level of units,<br>$DOL = \frac{Q(P-V)}{(Q(P-V)-F)} = \frac{(S-TVC)}{(S-TVC-F)}$<br>Q= Quantity of units sold<br>P=Price per unit<br>V= Variable cost per unit<br>F= Fixed costs<br>S= Sales<br>TVC=Total variable costs |
| 150 | Degree of financial leverage,<br>$DFL = \frac{\text{(Percentage change in EPS)}}{\text{(Percentage change in EBIT)}}$<br>DFL for particular level of operating units,<br>$DFL = \frac{EBIT}{(EBIT-Interest)}$ |
| 151 | Degree Of Total Leverage<br>DTL=DOL+DFL<br>$DTL = \frac{\text{(\% change in EBIT)}}{\text{(\% change in Sales)}} * \frac{\text{(\% change in EPS)}}{\text{(\% change in EBIT)}} = \frac{\text{(\% change in EPS)}}{\text{(\% Change in Sales)}}$<br>$DTL = \frac{Q(P-V)}{(Q(P-V)-F-I)} = \frac{(S-TVC)}{(S-TVC-F-I)}$ |
| 152 | Breakeven Quantity Of Sales,<br>$QBE = \frac{\text{(Fixed perating costs+Fixed financing costs)}}{\text{(Price-Variable cost per unit)}}$ |
| | **DIVIDENDS AND SHARE REPURCHASE BASICS** |
| 153 | Eps after buyback= $\frac{\text{(Total earnings-After tax cost of funds)}}{\text{(Shares outstanding after buyback)}}$ |
| | **WORKING CAPITAL MANAGEMENT** |
| 154 | Cost of trade credit=$(1+\frac{(\%discount)}{(1-\%discount)}$ 365/days past discount -1 |

| | PORTFOLIO RISK AND RETURN: PART II |
|---|---|
| 155 | Expected return when one asset is invested in risky asset and one asset in risk free asset<br>$E(R_p) = W_A E(R_A) + w_B E(R_B)$<br>$W_B = 1 - W_B$ |
| 156 | Capital market line equation,<br>$E(R_p) = Rf + \frac{(E(Rm)-Rf)}{(\sigma m)} \sigma p$ |
| 157 | Total Risk = systematic risk + unsystematic risk |
| 158 | General form of multifactor model,<br>$E(Ri)-Rf = \beta_{i1} * E(\text{Factor 1}) + \beta_{i2} * E(\text{factor 2}) + \ldots\ldots\ldots B_{ik} * E(\text{Factor k})$ |
| 159 | Equation of SML,<br>$E(Ri) = RFR + \frac{(E(Rm)-RFR)}{(\text{Variance of Market})}$ (Cov i,mkt) |
| 160 | M Square = $(Rp-Rf) \frac{(\text{Std Dev of m})}{(\text{Std Dev of p})} - (Rm-Rf)$ |
| 161 | Treynor Measure = $\frac{(Rp-Rf)}{\beta p}$ |
| 162 | Jenson's Alpha = $\alpha p = Rp-[Rf+\beta p(Rm-Rf)]$ |
| | **MARKET ORGANISATION AND STRUCTURE** |
| 163 | Margin call price = Po $\frac{((1-\text{initial margin}))}{((1-\text{maintenance margin}))}$<br>Po = initial purchase price |
| | **SECURITY MARKET INDICES** |
| 164 | Compounded Returns,<br>$R_p = (1+R1)(1+R2)(1+R3)\ldots\ldots (1+Rk)-1$<br>K = last sub period |
| 165 | Price weighted Index = $\frac{(\text{Sum of stock prices})}{(\text{Number of stocks in index adjusted for splits})}$ |
| 166 | Market weighted Index,<br>Current index value = $\frac{(\text{Current total market value of index stocks})}{(\text{Base year total market value of index stocks})}$ *Base year index value |
| 167 | Equal weighting index,<br>New index value = Initial index value (1 + Change in index) |

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| 168 | Dividend discount model,<br>One year holding period:<br>$Vo = \frac{Dt}{((1+ke)\ )} + \frac{(Year\ End\ Price)}{((1+ke))}$<br>Vo= Current stock value<br>Dt=Dividend at time t<br>Ke=Required rate of return<br><br>Two year holding period DDM,<br>$Value = \frac{D1}{((1+ke)\ )} + \frac{D2}{(1+ke)2} + \frac{P2}{((1+ke)2)}$<br><br>Multi-stage dividend discount model:<br>$Value = \frac{D1/}{(1+ke)\ )} + \frac{D2}{(1+ke)2} + \frac{Dn}{((1+ke)n\ )} + \frac{Pn}{((1+ke)n)}$<br><br>$Pn = \frac{(Dn+1)}{(Ke-gc)}$ |
| 169 | Free cash to equity,<br><br>FCFE= net income+ depreciation-increase in working capital-fixed capital investment-debt principal repayments+ new debt issues<br><br>FCFE=CFO-FC investment + net borrowing<br>CFO= Cash flow from operations. |
| 170 | Preferred stock value= $\frac{Dp}{kp}$<br>Dp= Fixed dividend<br>Kp=Required rate of return |
| 171 | Enterprise Value (EV)<br>EV= market value of common and preferred stock + market value of debt –cash and short term investment |
| 172 | Trailing P/E= $\frac{(Market\ price\ per\ share)}{(EPS\ over\ previous\ 12\ months)}$ |
| 173 | Leading P/E= $\frac{(Market\ price\ per\ share)}{(Forecast\ EPS\ over\ next\ 12\ months)}$ |
| 174 | P/B Ratio= $\frac{(Market\ value\ of\ equity)}{(Book\ value\ of\ equity)} = \frac{(Market\ price\ per\ share)}{(Book\ value\ per\ share)}$<br>Book value of equity= common shareholders equity = (total assets- total liabilities)-preferred stock |

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| 175 | P/S Ratio $= \frac{\text{(Market value of equity)}}{\text{(Total sales)}}$ |
| 176 | P/CF Ratio $\frac{\text{(Market value of equity)}}{\text{(Cash flow)}}$ |
| | **INTRODUCTION TO FIXED INCOME VALUATION** |
| 177 | Price of annual coupon bond,<br>$\text{Price} = \frac{\text{Coupon}}{((1+\text{YTM}))} + \frac{\text{Coupon}}{((1+\text{YTM})2)} + \ldots\ldots\ldots + \frac{\text{(Principal} + \text{Coupon)}}{((1+\text{YTM})n)}$<br>YTM = Yield to maturity<br>Price of semi-annual coupon bond,<br>$\text{Price} = \frac{\text{Coupon}}{\left(1+\frac{\text{YTM}}{2}\right)} \left(1+\frac{\text{Coupon}}{\frac{\text{YTM}}{2}}\right)2 + \ldots\ldots\ldots + \frac{\text{Principal} + \text{Coupon}}{\left(1+\frac{\text{YTM}}{2}\right)n*2}$ |
| 178 | Full Price = Flat price + Accrued interest |
| 179 | Current Yield $= \frac{\text{(Annual cash coupon payment)}}{\text{(Bond price)}}$ |
| 180 | Relation between forward rates and spot rates,<br>$(1+s_z)=(1+S')(1+1y1y)$ |
| 181 | Option Value = z spread –OAS |
| | **UNDERSTANDING FIXED INCOME RISK AND RETURN** |
| 182 | Modified duration,<br>For annual pay bond:<br>Modified duration = Macualay duration/ (1+YTM)<br>For semi-annual bond,<br>ModDursemi=MacDur/(1+ YTM/2 )<br>V¬_ = price increase<br>V+=price decrease<br>V0=current price<br>Approximate modified duration $= \frac{(V¬\_ - V+)}{2V0\Delta ytm}$ |
| 183 | Approximate % change in bond price = -ModDur*ΔYTM |
| 184 | Effective duration $= \frac{(V\_ - V+)}{2Vo\Delta Curve}$ |

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| 185 | Portfolio duration= $W_1D1_+ W_2D_2 +\ldots\ldots_+ W_nD_n$<br>W= Weight= Full price/total value<br>D=Duration on bond |
| 186 | Money duration= annual modified duration *full price of bond position<br><br>Money Duration per 100 units of par value= annual modified duration * full price per 100 of par value |
| 187 | Price value of a basis point (PVBP)= Average of decrease in value of bond when YTM increases and increase in value of bond when YTM decreases |
| 188 | Approximate Convexity= $V_- -V_+ -2V_{o/} (\Delta curve)^2 Vo$ |
| 189 | % change in Bond Price (when duration and convexity are given)<br><br>%ΔBond Value= -duration (Δspread)+1⁄2convexity (Δspread)2 |
| 190 | Duration Gap= Macaulay duration-Investment horizon |
| 191 | Return impact (%change in bond price)<br><br>For small spread changes,<br>Return impact ≈ -Modified duration *ΔSpread<br><br>For larger spread changes,<br>Return impact≈ -Modified duration *ΔSpread + 1⁄2convexity (Δspread)2 |
| 192 | Yield spread = liquidity premium + credit spread |
| 193 | Payment to the long at settlement,<br>$\text{(notional principal)} \dfrac{\text{(floating-foward)}\left(\frac{\text{days}}{360}\right)}{1+[\text{(floating)}\left(\frac{\text{days}}{360}\right)}$<br>Days= number of days in the loan term |
| 194 | Intrinsic value of call option,<br><br>C= max [0,S-X]<br>C= Intrinsic Value of Call option<br>S= Spot price<br>X= Strike price |
| 195 | Intrinsic value of a put option,<br><br>P=max[0,X-S]<br>P=intrinsic value of put |

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| 196 | Option value= intrinsic value+ time value |
| 197 | Put-call parity:<br>C+X/(1+RFR)t =S+P<br>C= Call<br>P=Put<br>S=Stock<br>X=Present value |
| 198 | Put call parity with assets cashflows,<br>C+X/(1+RFR)t =(So –PVcf) +P |
| 199 | Plain vanilla interest rate swap,<br>(Net fixed rate payment)t = (Swap rate- LIBORt-1) $\frac{((\text{Number of days})}{360)^*}$ notional principal |