List of Formulae

Chapter 3: Financial Statement Analysis

Revenues − Expenses = Income	$\text{Current ratio} = \dfrac{\text{Current assets}}{\text{Current liabilities}}$
$\text{Quick ratio} = \dfrac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}}$	$\text{Cash ratio} = \dfrac{\text{Cash} + \text{Marketable securities}}{\text{Current liabilities}}$
$\text{Inventory turnover ratio} = \dfrac{\text{Cost of goods sold}}{\text{Average inventory}}$	$\text{Inventory turnover ratio} = \dfrac{\text{Sales}}{\text{Inventory}}$
$\text{age of inventory} = \dfrac{365}{\text{Inventory turnover ratio}}$	$\text{Receivables turnover ratio} = \dfrac{\text{Annual credit sales}}{\text{Average receivables or debtors}}$
$\text{DSO} = \dfrac{\text{Receivables}}{\text{Average credit sales per day}}$	$\text{Fixed assets turnover} = \dfrac{\text{Sales}}{\text{Net fixed assets}}$
$\text{Total assets turnover} = \dfrac{\text{Sales}}{\text{Total assets}}$	$\text{Debt ratio} = \dfrac{\text{Total debt}}{\text{Total assets}}$
$\text{Debt equity ratio} = \dfrac{\text{Debt asset ratio}}{(1 - \text{Debt asset ratio})}$	$\text{Debt equity ratio} = \dfrac{\text{Total debt}}{\text{Total equity}}$
$\text{Long term debt to total assets ratio} = \dfrac{\text{Long term debt}}{\text{Total assets}}$	$\text{Debt asset ratio} = \dfrac{\text{Debt equity ratio}}{(1 + \text{Debt equity ratio})}$
$\text{Equity multiplier (EM)} = \dfrac{\text{Total assets}}{\text{Total equity}}$	$\text{Equity multiplier (EM)} = \dfrac{\text{Total assets}}{\text{Total equity}}$
$\text{EM} = \dfrac{1}{(1 - D/A)}$	$\text{Debt ratio} = 1 - \dfrac{1}{\text{Equity multiplier}}$
$\text{EM} = 1 + D/E$	$\text{TIE ratio} = \dfrac{\text{EBIT}}{\text{Interest charges}}$
$\text{EBITDA coverage ratio} = \dfrac{\text{EBITDA} + \text{Lease payments}}{\text{Interest} + \text{Principal payments} + \text{Lease payments}}$	$\text{Net profit margin on sales} = \dfrac{\text{Net income}}{\text{Sales}}$
$\text{Gross profit margin on sales} = \dfrac{\text{Gross profit}}{\text{Sales}}$	$\text{Operating profit margin} = \dfrac{\text{EBIT}}{\text{Sales}}$
$\text{Basic earning power ratio} = \dfrac{\text{EBIT}}{\text{Total assets}}$	$\text{Return on total assets (ROA)} = \dfrac{\text{Net income}}{\text{Total assets}}$
$\text{Return on common equity (ROE)} = \dfrac{\text{Net income}}{\text{Common equity}}$	$\text{Price / earning ratio} = \dfrac{\text{Price per share}}{\text{Earning per share}}$
$\text{Market / book ratio} = \dfrac{\text{Market price per share}}{\text{Book value per share}}$	$\text{Earnings yield} = \dfrac{\text{Earnings per share}}{\text{Market value per share}}$
$\text{EPS} = \dfrac{\text{Net profit after tax} - \text{Preference dividend}}{\text{Number of common shares}}$	$\text{DPS} = \dfrac{\text{Dividend paid to equity shareholders}}{\text{Number of equity shares}}$
$\text{Dividend payout ratio} = \dfrac{\text{DPS}}{\text{EPS}}$	$\text{Retention rate} = \dfrac{\text{Retained earnings}}{\text{Net income}}$
$\text{Retention rate} = \dfrac{\text{EPS} - \text{DPS}}{\text{EPS}} = \dfrac{\text{REPS}}{\text{EPS}}$	$\text{Retention ratio} = 1.0 - \text{Payout ratio}$
$\text{Dividend yield} = \dfrac{\text{Dividend per share}}{\text{Market value per share}}$	$\text{(ROA)} = \text{Net Profit Margin} \times \text{Total Assets Turnover}$
$\text{ROE} = \text{Net profit margin} \times \text{Total assets turnover} \times \text{Equity multiplier}$	

Chapter 4: Time value of money

$FV = PV\,(1 + i)^n$	$FV_n = PV\,(FVIF_{i,n})$
$PV = FV_n\,(PVIF_{i,n})$	$PV = \dfrac{FV_n}{(1 + i)^n}$
$i = \left(\dfrac{FV}{PV}\right)^{1/n} - 1$	$n = \dfrac{\ln(FV/PV)}{\ln(1 + i)}$
$FVA_n = PMT \times \left[\dfrac{(1 + i)^n - 1}{i}\right]$	$FVA_n = PMT\,(FVIFA_{i,n})$
$FVA_{(DUE)} = PMT \times \left[\dfrac{(1 + i)^n - 1}{i}\right](1 + i)$	$FVA_{(due)} = PMT\,(FVIFA_{i,n})(1 + i)$

$PVA_n = PMT \left[\dfrac{1 - \dfrac{1}{(1+i)^n}}{i} \right]$	$PVA_n = PMT\ (PVIFA_{i,n})$
$PVA_{(due)} = PMT \times \left[\dfrac{1 - \dfrac{1}{(1+i)^n}}{i} \right](1+i)$	$PVA_{(due)} = PMT\ (PVIFA_{i,n})\ (1+i)$
$n = \dfrac{\ln\,[PMT/(PMT - PV \times i)]}{\ln\,(1+i)}$	$PV_{Perpetuity} = \dfrac{PMT}{i}$
$PV = \dfrac{CF_1}{(1+i)^1} + \dfrac{CF_2}{(1+i)^2} + \dfrac{CF_3}{(1+i)^3} + \ldots + \dfrac{CF_n}{(1+i)^n}$	$FV_n = CF_1(1+i)^{n-1} + CF_2(1+i)^{n-2} + \ldots + CF_n(1+i)^{n-n}$
$FV_{mn} = PV \left(1 + \dfrac{i}{m}\right)^{m \times n}$	$FV_n = PV\ (e^{i \times n})$
Periodic rate $(i_{PER}) = \dfrac{i_{Nom}}{m}$	Nominal annual rate $= i_{Nom}$ = Periodic rate $\times$ m
Effective annual interest rate $= \left(1 + \dfrac{i}{m}\right)^m - 1.0$	Effective annual interest rate $= e^i - 1$
$PMT = \dfrac{PVA_n\ Or,\ Amount\ of\ loan}{PVIFA_{i,n}}$	$EMI = \dfrac{Amount\ of\ loan}{PVIFA_{i/m,m \times n}}$
$EMI = \dfrac{Amount\ of\ loan}{\left[\dfrac{1 - \dfrac{1}{(1+i/m)^{m \times n}}}{i/m}\right]}$	

Chapter 5: Financial Assets Valuation

$V0 = \dfrac{I}{k_d}$	$V0 = \dfrac{M}{(1+k_d)^n}$
$V0 = I\left[\dfrac{1 - \dfrac{1}{(1+k_d)^n}}{k_d}\right] + \dfrac{M}{(1+k_d)^n}$	$V0 = I \times (PVIFA k_{d,n}) + M \times (PVIF k_{d,n})$
$V0 = I/2\left[\dfrac{1 - \dfrac{1}{(1+k_d/2)^{2n}}}{k_d/2}\right] + \dfrac{M}{(1+k_d/2)^{2n}}$	$V0 = I/2\ (PVIFA\ k_{d/2,\,2 \times n}) + M\ (PVIF\ k_{d/2,\,2 \times n})$
Coupon yield $= \dfrac{Annual\ interest\ payment\ (I)}{Face\ value\ of\ bond\ (M)}$	Current yield $= \dfrac{Annual\ interest\ payment\ (I)}{Market\ price\ of\ bond\ (P_0)}$
$HPR_t = \dfrac{(P_1 - P_0) + I_1}{P_0} \times 100\%$	Approximate YTM $= \dfrac{I + \dfrac{M - P_0}{n}}{\dfrac{M + 2P_0}{3}}$
$YTM = LR + \dfrac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} \times (HR - LR)$	$AYTC\ (k_c) = \dfrac{I + \dfrac{P_c - P_0}{n_c}}{\dfrac{P_c + 2P_0}{3}}$
Capital gain yield $=$ YTM $=$ current yield	Capital gain yield $= \dfrac{V_1 - V_0}{V_0}$
$P_0 = \dfrac{D0}{k_s}$	$P_0 = \dfrac{D_1}{k_s - g}$
$D_t = D_0\ (1+g)^t$	$E_t = E_0\ (1+g)^t$
$g = b \times ROE$	$k_s = \dfrac{D_1}{P_0} + g$
$P_0 = \dfrac{D_1}{(1+k_s)^1} + \dfrac{D_2}{(1+k_s)^2} + \ldots + \dfrac{D_n}{(1+k_s)^n} + \dfrac{P_n}{(1+k_s)^n}$	$P_0 = \dfrac{D_1}{(1+k_s)^1} + \dfrac{P_1}{(1+k_s)^1}$
$P_0 = \dfrac{D_1}{(1+k_s)^1} + \dfrac{D_2}{(1+k_s)^2} + \dfrac{P_2}{(1+k_s)^2}$	$V_{ps} = \dfrac{D_{ps}}{k_{ps}}$
$V_{ps} = \dfrac{D_{ps}}{(1+k_{PS})^t} + \dfrac{M}{(1+k_{PS})^n}$	$V_{ps} = D_{ps} \times (PVIFA, k_{ps,n}) + M\ (PVIF, k_{ps,n})$

Chapter 6: Basics of capital budgeting decision

Payback period = $\dfrac{\text{Initial outlay}}{\text{Annual cash flow}}$	PBP = Min. year + $\dfrac{\text{Amount to recover}}{\text{Cash flow during the year}}$
ARR = $\dfrac{\text{Average earning after tax}}{\text{Average initial outlay}}$	ARR = $\dfrac{\text{Average earning after tax}}{\text{Initial outlay}}$
DPBP = Min.year + $\dfrac{\text{Amount to recover}}{\text{PV of cash flow during the year}}$	NPV = $\dfrac{CF_1}{(1+k)^1} + \dfrac{CF_2}{(1+k)^2} + ... + \dfrac{CF_n}{(1+k)^n} - CF_0$
NPV = $CF \times PVIFA_{k,n} - CF_0$	Profitability index (PI) = $\dfrac{\text{Total present value}}{\text{Net cash outlay}}$
$\dfrac{CF_1}{(1+IRR)^1} + \dfrac{CF_2}{(1+IRR)^2} + ... + \dfrac{CF_n}{(1+IRR)^n} - CF_0 = 0$	IRR = LR + $\dfrac{Factor_{LR} - Factor_{exact}}{Factor_{LR} - Factor_{HR}} \times (HR - LR)$
IRR = LR + $\dfrac{TPV_{LR} - NCO}{TPV_{LR} - TPV_{HR}} \times (HR - LR)$	IRR = LR + $\dfrac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} \times (HR - LR)$
PV costs = $\dfrac{FV}{(1+MIRR)^n}$	

Chapter 7: Raising capital

Number of shares required for all directors = $\dfrac{N}{2} + 1$ Where, N = Total shares outstanding	req = $\dfrac{\text{des (N)}}{\# + 1} + 1$
Underwriting spread = Selling price to public − Proceeds to company	Value of right (v_r) = $\dfrac{P_0 - P_s}{\# + 1}$
Value of one right (v_r) = $\dfrac{P_e - P_s}{\#}$	$P_e = P_0 - v_r$
No. of new shares = $\dfrac{\text{Funds to be raised}}{\text{Subscription price}}$	# = $\dfrac{\text{Number of old shares outstanding}}{\text{Number of new shares to be issued}}$
Wealth position = $P_0 \times$ Number of old shares + Cash balance (if any)	Wealth position = P_e (Number. of old shares + Number of new share) − (Subscription price × Number of new shares) + Cash balance (if any)
Wealth position = P_e (Number of old shares) + $(v_r \times$ Number. of rights sold) + Cash balance (if, any)	Wealth position = Pe (Number of old share + Number of new share) + v_r × Number of rights sold − Ps × Number of new share purchased. + Cash (if any)
Wealth position = P_e (Number of old shares) + Cash (if any)	

Chapter 8: Capital Structure and Leverage

Capital structure = Financial structure − Current Liabilities	Financial structure = Current liabilities + Long term debt + Common equity
DOL = $\dfrac{\text{Percent change in EBIT}}{\text{Percent change in Sales}}$	$DOL_Q = \dfrac{Q(P-V)}{Q(P-V) - FC}$
$DOL_S = \dfrac{\text{Gross profit}}{\text{EBIT}} = \dfrac{S - VC}{S - VC - FC}$	DFL = $\dfrac{\text{Percent change in EPS}}{\text{Percent change in EBIT}}$
DFL = $\dfrac{EBIT}{EBIT - I - \dfrac{DPS}{(1-T)}}$	DTL = DOL × DFL
DTL = $\dfrac{\text{Gross profit}}{EBIT - I - \dfrac{D_P}{(1-T)}}$	EPS (new) = EPS (old) [1 + (% Δ sales) (DTL)]

Chapter 9: Working capital

Working capital = Total of all current assets	Net working capital (NWC) = Current assets − current liabilities
ICP = $\dfrac{\text{Inventory}}{\text{Cost of goods sold} / 360}$	ICP = $\dfrac{\text{Average inventory}}{\text{Cost of goods sold} / 360}$
ICP = $\dfrac{\text{Days in a year}}{\text{Inventory turnover}}$	Inventory turnover = $\dfrac{\text{Cost of goods sold}}{\text{Inventories}}$

Inventory turnover = $\dfrac{\text{Sales}}{\text{Inventories}}$	$RCP = \dfrac{\text{Receivables}}{\text{Credit sales}/360}$
$RCP = \dfrac{\text{Average accounts receivables}}{\text{Credit sales}/360}$	$RCP = \dfrac{\text{Days in a year}}{\text{Receivables turnover}}$
Operating cycle = ICP + RCP	$PDP = \dfrac{\text{Accounts payable}}{\text{Cost of goods sold}/360}$
$PDP = \dfrac{\text{Average accounts payable}}{\text{Cost of goods sold}/360}$	$PDP = \dfrac{\text{Accounts payable}}{\text{Credit purchase}/360}$
CCC = ICP + RCP – PDP	External financing needed = CCC x working capital per day

Chapter 10: International Corporate Finance

Forward premium or (discount) = $\dfrac{S-F}{F} \times \dfrac{360}{n}$	Forward premium or (discount) = $\dfrac{F-S}{S} \times \dfrac{360}{n}$
$\dfrac{f_h}{S_h} = \dfrac{(1+k_h)}{(1+k_f)}$	$P_h = (P_f)\,(\text{Spot rate})$

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