Chapter 2: Balance Sheet, Income Statement and CFFA

Balance sheet
CA = cash + AR + inventory
TA = CA + NFA + other intangible assets
CL = AP+NP
TL or TD or D = CL - LTD
OE or TE or E = CS at par + add. paid-in surplus - RE - preferred stock (if any)
CS = CS at par - add. paid-in surplus or capital - RE
TA = TL = OE
NWC = CA - CL

Income statement
EBIT = sales - CGS - depreciation - other expenses
Taxable income or EBT = EBIT - interest paid; Taxable income = \( \frac{NI}{(1-T)} \)

Taxes = taxable income x tax rate
NI = Taxable income - taxes
NI = add. to RE + dividends
EPS = NI/ (# of shares outstanding)
PE ratio = current price/EPS

CFFA (2 ways)
a) CFFA = OCF - NCS - \( \Delta NWC \)
OCF = EBIT - depreciation - taxes
NCS = NFA_{end} - NFA_{beg} - depreciation
\( \Delta NWC = NWC_{end} - NWC_{beg} = (CA_{end} - CL_{end}) - (CA_{beg} - CL_{beg}) \)
b) CFFA = CF to creditors + CF to shareholders
CF to creditors = interest paid - net new borrowing = interest paid - (LTD_{end} - LTD_{beg})
CF to stockholders = dividends paid - net new equity raised = dividends paid - (OE_{end} - OE_{beg} - add. to RE (if any))

Taxes: Average tax rate = taxes to be paid/taxable income

Chapter 3: Ratios
PM = NI/sales; TAT = sales/TA; EM = 1 + (TL/OE) = TA/OE
ROA = NI/TA = (NI/sales) x (sales/TA) = PM x TAT
ROE = NI/OE = (NI/sales) x (sales/TA) x (TA/OE) = PM x TAT x EM = ROA x EM
Dividend payout ratio = Cash dividends / Net income
Retention or plowback ratio (b) = add. to RE/NI = (NI - cash dividends)/NI = 1 - dividend payout ratio

Internal Growth Rate = \( \frac{(ROA \times b)}{(1 - (ROA \times b))} \)
Sustainable Growth Rate = \( \frac{(ROE \times b)}{(1 - (ROE \times b))} \)

Current ratio = CA/CL;
Quick ratio = (CA - Inventory)/CL;

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Cash ratio: Cash / Current Assets
Total debt ratio: Total Liabilities / Total Assets
Debt to equity ratio: Total Liabilities / Shareholders' Equity
TIE: EBIT / Interest
Cash coverage: (EBIT - Depreciation) / Interest
Inventory turnover: Cost of Goods Sold / Average Inventory
Days sales in inventory: 365 / Inventory turnover
Receivable turnover: Sales / Average Receivables
Days sales in receivables: 365 / Receivable turnover
Capital intensity: Total Assets / Sales
Market to book ratio: Market value per share / Book value per share

Chapter 4

Single cash flows

Compound interest: \( FV = PV \left( 1 + \frac{r}{n} \right)^n \)
Simple interest: \( FV = PV + (PV \cdot r \cdot n) \)
Interest on interest: \( FV = PV \left( 1 + \frac{r}{n} \right)^{n \cdot m} \)

Chapter 5

Ordinary Annuities

\[
PV = PMT \left( \frac{1 - \frac{1}{(1 + r)^n}}{r} \right)
\]
\[
FV = PMT \left( \frac{(1 + r)^n - 1}{r} \right)
\]

Total interest paid over the life of an amortized loan: \((PM1 - number of payments) \times amount borrowed\)

Annuities Due

\[
PV = PMT \left( \frac{1 - \frac{1}{(1 + r)^n}}{r} \right) \cdot (1 + r)
\]
\[
FV = PMT \left( \frac{(1 + r)^n - 1}{r} \right) \cdot (1 + r)
\]

Perpetuities: \( PV = \frac{C}{r} \)

Chapter 6: Bonds

Annual Coupon Payment: coupon rate \times PV:

\[
PV = PMT \left( \frac{(1 + YTM)^{-1} - 1}{YTM(1 - YTM)} \right) \cdot (1 + YTM)
\]

Fisher Equation: \(1 + R = (1 + r)(1 + h)\)

Municipal vs. corporate bonds: \( r(1 - T) = r \)

FINA 3310 Formulas: Chapters 7, 8, 9

Tentative Formulas for ch. 7, 8, 9

Chapter 7

Simple cash flow: \( P \frac{F}{P } \)

Level perpetuity: \( P \frac{F}{P } \)

Growing Perpetuity: \( P \frac{F}{P } \)

Chapter 8

\[ V = \sum_{t=1}^{n} \frac{C_t}{(1 + r)^t} \]

Chapter 10

Depreciation

Straight-line annual depreciation: \( \frac{\text{Total acquisition cost}}{n} \)

MACRS Depreciation

MACRS annual depreciation = MACRS rate x book value

Accum Deprec = cumulative depreciation up to and including year 11

BM - in the case of Accum Deprecional, initial year refers to MACRS year 12 and including year 11

\[ \text{MACRS} = \frac{\text{BM}}{\text{NWC} \times n} \]

Net Working Capital and ANWE

\[ \text{O} = \text{Current Assets} - \text{Current Liabilities} \]

\[ \text{NWC} = \text{O} - \text{WACC} \times \text{BM} \]

\[ \text{ANWE} = \text{O} + \text{WACC} \times \text{BM} \]

\[ \text{ANWE} = \text{BM} \times \text{WACC} \]

\[ \text{Recovery} = \text{replacement of NWC} \times \text{WACC} = \text{ANWE} \times \text{WACC} \]

Various ways of calculating DCF during years:

DCF: \[ \text{Revenue} - \text{fixed costs} - \text{depreciation} \times \text{WACC} \]

DCF: \[ \text{Production} - \text{costs - depreciation} \times \text{WACC} \]

**Very important additional notes on DCF:**

If the undertaking of a new project will affect the sales of either existing product, the effect should be included in the cash flows. Typically, increased sales and reduced variable costs affect cash flows positively. Increased fixed costs affect cash flows negatively. However, the effects of variable costs should be added to cash flows with a positive sign, while the effects of variable costs with a negative sign should be subtracted from cash flows with a negative sign.
Formulas for Chapters 10, 11, 12

Chapter 10

\[ R = \frac{P}{P_0} \]

\[ \text{GIFR} = \left( R_1 + R_2 + \ldots + R_n \right) / n \]

\[ \text{Average R} = \frac{R_1 + R_2 + \ldots + R_n}{n} \]

\[ \sum_{k=1}^{n} R_k \]

Chapter 11

\[ \text{LIR} = pr \cdot R \]

\[ \text{LIR} = w_1 (r_1 + r_2 + \ldots + r_n) \]

\[ w_1 \cdot \beta \cdot \Sigma w_1 \cdot \beta \cdot \beta \]

\[ \text{SML} = LIR(r_1, r_2, \ldots, r_n) = LIR(r_1, r_2, \ldots, r_n) = \beta \cdot \Sigma w_1 \cdot \beta \]

\[ \text{RP} = LIR(r_1, r_2, \ldots, r_n) = \text{RP} \]

Chapter 12

\[ \text{BA} = c_a \cdot r_a \cdot T = w_1 \cdot r_1 \cdot \ldots \cdot w_n \cdot r_n \]

\[ \text{BA} = \text{number of bonds} \times \text{bond price} + \text{number of preferred shares} \times \text{preferred share price} \]

\[ \text{BA} = \text{number of common shares} \times \text{common share price} \]

\[ w_1 \cdot \beta \cdot \ldots \cdot w_n \cdot \beta \]

\[ \text{Before-tax cost of debt, } r_d = \text{YTM on the company's bonds} \]

\[ \text{PV} = \frac{PMT}{\text{YTM}} \]

\[ \text{PV} = \frac{PMT}{\text{YTM}} \]

\[ \text{PMT} = \text{coupon rate} \times FV \]

Cost of preferred, \( r_d \cdot P \cdot \frac{D}{P} \)

Cost of common equity, \( \beta \cdot \frac{P}{D} \cdot \frac{D}{P} \)