Income Statement Structure

Net sales
- Cost of goods sold

Gross profit
- Operating expenses
- Depreciation Expense

Operating profit
- Interest expense

Profit before taxes
- Taxes

Net income

Balance Sheet…

ASSETS	**LIABILITIES**
Cash	Notes Payable
Net Accounts Receivable	Accounts Payable
Inventories	Accrued Expenses
Total Current Assets	Current Portion of Long-Term Debt
	Total Current Liabilities
Gross Fixed Assets	
(less Accumulated Depreciation)	Long-Term Debt (excluding the current portion)
Net Fixed Assets	**Total Liabilities**
Total Assets	
	EQUITY
	Preferred Stock
	Common Stock
	Retained Earnings
	Total Liabilities and Equity

Chapter 2

Analysis of Financial Statements

$$\text{Net cash flow} = \text{Net income} + \text{Depreciation and amortization} \quad 2.1$$

$$\text{ROA} = \text{Net profit margin} \times \text{Total assets turnover}$$

$$= \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}}$$

$$= \frac{\text{Net income}}{\text{Total assets}} \quad 2.2$$

$$\text{ROE} = \text{ROA} \times \text{Equity multiplier}$$

$$= \frac{\text{Net income}}{\text{Total asssts}} \times \frac{\text{Total assets}}{\text{Common equity}} \quad 2.3$$

$$\text{ROE} = \left[\begin{pmatrix}\text{Profit}\\ \text{margin}\end{pmatrix} \times \begin{pmatrix}\text{Total assets}\\ \text{turnover}\end{pmatrix}\right] \times \begin{pmatrix}\text{Equity}\\ \text{multiplier}\end{pmatrix}$$

$$= \left[\frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}}\right] \times \frac{\text{Total assets}}{\text{Common equity}} \quad 2.4$$

Chapter 3

The Financial Environment: Markets, Institutions, and Investment Banking

$$\text{Amount of issue} = \frac{NP + OC}{(1 - F)} \quad 3.1$$

Chapter 4

Time Value of Money

$$FV_n = PV(1 + r)^n \quad 4.1$$

$$FVA_n = PMT[(1 + r)^{n-1} + (1 + r)^{n-2} + \cdots + (1 + r)^0]$$

$$= PMT\sum_{t=0}^{n-1}(1 + r)^t = PMT\left[\frac{(1 + r)^n - 1}{r}\right] \quad 4.2$$

$$FVA(DUE)_n = PMT\sum_{t=0}^{n-1}(1 + r)^t (1 + r)$$

$$= PMT\left\{\left[\frac{(1 + r)^n - 1}{r}\right] \times (1 + r)\right\} \quad 4.3$$

$$FVCF_n = CF_1(1 + r)^{n-1} + \cdots + CF_n(1 + r)^0$$

$$= \sum_{t=1}^{n} CF_t(1 + r)^{n-t} \quad 4.4$$

$$PV = \frac{FV_n}{(1 + r)_n} = FV_n\left[\frac{1}{(1 + r)^n}\right] \quad 4.5$$

$$PVA_n = PMT\left[\sum_{t=1}^{n}\frac{1}{(1 + r)^t}\right] = PMT\left[\frac{1 - \frac{1}{(1 + r)^n}}{r}\right] \quad 4.6$$

$$PVA(DUE)_n = PMT\left\{\sum_{t=1}^{n}\left[\frac{1}{(1 + r)^t}\right](1 + r)\right\}$$

$$= PMT\left\{\left[\frac{1 - \frac{1}{(1 + r)^n}}{r}\right] \times (1 + r)\right\} \quad 4.7$$

$$PVP = PMT\left[\frac{1}{r}\right] = \frac{PMT}{r} \quad 4.8$$

$$PVCF_n = CF_1\left[\frac{1}{(1 + r)^1}\right] + \cdots + CF_n\left[\frac{1}{(1 + r)^n}\right]$$

$$= \sum_{t=1}^{n} CF_t\left[\frac{1}{(1 + r)^t}\right] \quad 4.9$$

$$\text{Periodic rate} = r_{PER} = \frac{\begin{pmatrix}\text{Stated annual}\\ \text{interest rate}\end{pmatrix}}{\begin{pmatrix}\text{Number of interest}\\ \text{payments per year}\end{pmatrix}}$$

$$= \frac{r_{SIMPLE}}{m} \quad 4.10$$

$$\text{Number of interest periods over n years} = n_{PER} = \begin{pmatrix}\text{Number}\\ \text{of years}\end{pmatrix} \times \begin{pmatrix}\text{Number of interest}\\ \text{payments per year}\end{pmatrix}$$

$$= n_{YRS} \times m \quad 4.11$$

$$\text{Effective annual rate (EAR)} = r_{EAR} = \left(1 + \frac{r_{SIMPLE}}{m}\right)^m - 1.0$$

$$= (1 + r_{PER})^m - 1.0 \quad 4.12$$

Chapter 5

The Cost of Money (Interest Rates)

$$\text{Yield} = \frac{\text{Total dollar return}}{\text{Beginning value}} = \frac{\text{Dollar income} + \text{Capital gains}}{\text{Beginning value}}$$

$$= \frac{\text{Dollar income} + (\text{Ending value} - \text{Beginning value})}{\text{Beginning value}} \quad 5.1$$

$$\text{Rate of return} = r = \left(\text{Risk-free rate}\right) + \left(\text{Risk premium}\right) \qquad 5.2$$

$$\begin{aligned} r &= r_{RF} + RP \\ &= r_{RF} + [DRP + LP + MRP] \end{aligned} \qquad 5.3$$

$$r_{Treasury} = r_{RF} + MRP = (r^* + IP) + MRP \qquad 5.4$$

$$\text{Yield (\%) on an n-year bond} = \frac{R_1 + R_2 + \cdots + R_n}{n} \qquad 5.5$$

$$\begin{aligned} \text{Value of an asset} &= \frac{\hat{CF}_1}{(1+r)^1} + \frac{\hat{CF}_2}{(1+r)^2} + \cdots + \frac{\hat{CF}_n}{(1+r)^n} \\ &= \sum_{t=1}^{n} \frac{\hat{CF}_t}{(1+r)^t} \end{aligned} \qquad 5.6$$

Chapter 6

Bonds (Debt)—Characteristics and Valuation

$$\text{Bond value} = V_d = INT\left[\frac{1 - \frac{1}{(1+r_d)^N}}{r_d}\right] + M\left[\frac{1}{(1+r_d)^N}\right] \qquad 6.1$$

$$V_d = \left(\frac{INT}{2}\right)\left[\frac{1 - \frac{1}{(1 + r_d/2)^{2\times N}}}{(r_d/2)}\right] + \frac{M}{\left(1 + r_d/2\right)^{2\times N}} \qquad 6.2$$

$$\begin{aligned} \text{Bond yield} &= \text{Current yield} + \text{Capital gains yield} \\ &= \frac{INT}{V_{d,Begin}} + \frac{V_{d,End} - V_{d,Begin}}{V_{d,Begin}} \end{aligned} \qquad 6.3$$

Chapter 7

Stocks (Equity)—Characteristics and Valuation

$$\begin{aligned} \text{Stock value} = V_s = \hat{P}_0 &= \frac{\hat{D}_1}{(1+r_s)^1} + \cdots + \frac{\hat{D}_\infty}{(1+r_s)^\infty} \\ &= \sum_{t=1}^{\infty} \frac{\hat{D}_t}{(1+r_s)^t} \end{aligned} \qquad 7.1$$

$$\begin{aligned} \hat{P}_0 &= \frac{D_0(1+g)^1}{(1+r_s)^1} + \frac{D_0(1+g)^2}{(1+r_s)^2} + \cdots + \frac{D_0(1+g)^\infty}{(1+r_s)^\infty} \\ &= \frac{D_0(1+g)}{r_s - g} = \frac{\hat{D}_1}{r_s - g} \\ &= \text{value of a constant growth stock} \end{aligned} \qquad 7.2$$

$$\begin{aligned} \text{Expected rate of return} &= \text{Expected dividend yield} + \text{Expected growth rate, or capital gains yield} \\ \hat{r}_s &= \frac{\hat{D}_1}{P_0} + g \end{aligned} \qquad 7.3$$

$$\begin{aligned} \hat{P}_t &= \frac{\left(\text{Final nonconstant growth dividend}\right) + (1 + g_{norm})}{r_s - g_{norm}} = \frac{\left(\text{First constant growth dividend}\right)}{r_s - g_{norm}} \\ &= \frac{\hat{D}_t(1 + g_{norm})}{r_s - g_{norm}} = \frac{\hat{D}_{t+1}}{r_s - g_{norm}} \end{aligned} \qquad 7.4$$

$$\begin{aligned} \text{Economic value added} &= EVA \\ &= EBIT(1 - T) - \left[\left(\text{Average cost of funds}\right) \times \left(\text{Invested capital}\right)\right] \end{aligned} \qquad 7.5$$

Chapter 8

Risk and Rates of Return

$$\begin{aligned} \text{Expected rate of return} = \hat{r} &= Pr_1 r_1 + \cdots + Pr_n r_n \\ &= \sum_{i=1}^{n} Pr_i r_i \end{aligned} \qquad 8.1$$

$$\begin{aligned} \text{Standard deviation} = \sigma &= \sqrt{(r_1 - \hat{r})^2 Pr_1 + \cdots + (r_n - \hat{r})^2 Pr_n} \\ &= \sqrt{\sum_{i=1}^{n} (r_i - \hat{r})^2 Pr_i} \end{aligned} \qquad 8.2$$

$$\text{Estimated } \sigma = s = \sqrt{\frac{\sum_{t=1}^{n} (\ddot{r}_t - \bar{r})^2}{n - 1}} \qquad 8.3$$

$$\bar{r} = \frac{\ddot{r}_1 + \ddot{r}_2 + \cdots + \ddot{r}_n}{n} = \frac{\sum_{t=1}^{n} \ddot{r}_t}{n} \qquad 8.4$$

$$\text{Coefficient of variation} = CV = \frac{\text{Risk}}{\text{Return}} = \frac{\sigma}{\hat{r}} \qquad 8.5$$

$$\begin{aligned} \text{Expected portfolio return} = \hat{r}_p &= w_1\hat{r}_1 + w_2\hat{r}_2 + \cdots + w_N\hat{r}_N \\ &= \sum_{j=1}^{N} w_j \hat{r}_j \end{aligned} \qquad 8.6$$

Portfolio beta $= \beta_p = w_1\beta_1 + \cdots + w_N\beta_N$

$$= \sum_{j=1}^{N} w_j\beta_j \qquad \textbf{8.7}$$

Risk premium for Stock j $= RP_j = RP_M \times \beta_j$

$$= (r_M - r_{RF})\beta_j \qquad \textbf{8.8}$$

$$\text{Required return} = \text{Risk-free return} + \text{Premium for risk}$$

$$r_j = r_{RF} + RP_j \qquad \textbf{8.9}$$

$$r_j = r_{RF} + (RP_M)\beta_j$$
$$= r_{RF} + (r_M - r_{RF})\beta_j \qquad \textbf{8.10}$$

Chapter 9
Capital Budgeting Techniques

$$NPV = \hat{CF}_0 + \frac{\hat{CF}_1}{(1+r)^1} + \frac{\hat{CF}_2}{(1+r)^2} + \cdots + \frac{\hat{CF}_n}{(1+r)^n}$$
$$= \sum_{t=0}^{n} \frac{\hat{CF}_t}{(1+r)^t} \qquad \textbf{9.1}$$

$$NPV = \hat{CF}_0 + \frac{\hat{CF}_1}{(1+IRR)^1} + \cdots + \frac{\hat{CF}_n}{(1+IRR)^n} = 0$$

or

$$\hat{CF}_0 = \frac{\hat{CF}_1}{(1+IRR)^1} + \cdots + \frac{\hat{CF}_n}{(1+IRR)^n} \qquad \textbf{9.2}$$

$$\text{PV of cash outflows} = \frac{TV}{(1+MIRR)^n}$$

$$\sum_{t=0}^{n} \frac{COF_t}{(1+r)^t} = \frac{\sum_{t=0}^{n} CIF_t(1+r)^{n-t}}{(1+MIRR)^n} \qquad \textbf{9.3}$$

$$\text{Traditional payback period (PB)} = \left(\begin{array}{c}\text{The year just } \textit{prior} \\ \text{to the year of full recovery} \\ \text{of initial investment}\end{array}\right) + \left(\frac{\begin{array}{c}\text{Amount of intial investment that is } \textit{unrecovered} \\ \text{at the start of the recovery year}\end{array}}{\begin{array}{c}\text{Total cash flow generated} \\ \text{during the recovery year}\end{array}}\right) \qquad \textbf{9.4}$$

Chapter 10
Project Cash Flows and Risk

$$\text{Supplemental operating, } \hat{CF}_t = \Delta\text{Cash revenues}_t - \Delta\text{Cash expenses}_t - \Delta\text{Taxes}_t$$
$$= \Delta NOI_t \times (1 - T) + \Delta Depr_t$$
$$= (\Delta NOI_t + \Delta Depr_t) \times (1 - T) + T\Delta Depr_t \qquad \textbf{10.1}$$

Chapter 11
The Cost of Capital

$$\left(\begin{array}{c}\text{After-tax} \\ \text{component} \\ \text{cost of debt}\end{array}\right) = r_{dT} = \left(\begin{array}{c}\text{Bondholders'} \\ \text{required} \\ \text{rate of return}\end{array}\right) - \left(\begin{array}{c}\text{Tax} \\ \text{savings}\end{array}\right)$$
$$= r_d - r_d \times T$$
$$= r_d(1 - T) \qquad \textbf{11.1}$$

$$V_d = \frac{INT}{(1+YTM)^1} + \cdots + \frac{INT + M}{(1+YTM)^N}$$
$$= \frac{INT}{(1+r_d)^1} + \cdots + \frac{INT + M}{(1+r_d)^N} \qquad \textbf{11.2}$$

$$\text{Component cost of preferred stock} = r_{ps} = \frac{D_{ps}}{P_0 - \text{Flotation costs}}$$
$$= \frac{D_{ps}}{P_0(1-F)} = \frac{D_{ps}}{NP_0} \qquad \textbf{11.3}$$

$$\text{Required rate of return} = \text{Expected rate of return}$$
$$r_s = \hat{r}_s$$
$$r_{RF} + RP_s = \frac{\hat{D}_1}{P_0} + g \qquad \textbf{11.4}$$

$$r_s = r_{RF} + RP_s = r_{RF} + RP_M\beta_s = r_{RF} + (r_M - r_{RF})\beta_s \qquad \textbf{11.5}$$

$$r_s = \hat{r}_s = \frac{\hat{D}_1}{P_0} + g \qquad \textbf{11.6}$$

$$r_e = \frac{\hat{D}_1}{NP_0} + g = \frac{\hat{D}_1}{P_0(1-F)} + g \qquad \textbf{11.7}$$

$$WACC = w_d(r_{dT}) + w_{ps}(r_{ps}) + w_s(r_s \text{ or } r_e) \qquad \textbf{11.8}$$