BOOK 4 – CORPORATE FINANCE, PORTFOLIO MANAGEMENT, AND ANALYSIS OF EQUITY INVESTMENTS

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FORMULAS

$$\text{IRR: } 0 = CF_0 + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_n}{(1+IRR)^n} = \sum_{t=0}^{n} \frac{CF_t}{(1+IRR)^t}$$

$$NPV = CF_0 + \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \ldots + \frac{CF_n}{(1+k)^n} = \sum_{t=0}^{n} \frac{CF_t}{(1+k)^t}$$

$$\text{payback period} = \text{full years until recovery} + \frac{\text{unrecovered cost at the beginning of the last year}}{\text{cash flow during the last year}}$$

$$AAR = \frac{\text{average net income}}{\text{average book value}}$$

$$PI = \frac{\text{PV of future cash flows}}{CF_O}$$

$$WACC = (w_d)[k_d\,(1-t)] + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

cost of common equity:

$$k_{ce} = \frac{D_1}{P_0} + g$$

$$k_{ce} = RFR + \beta[E(R_m) - RFR]$$

k_{ce} = bond yield + risk premium

after-tax cost of debt = $k_d\,(1-t)$

cost of preferred stock = $k_{ps} = D_{ps} / P$

$$DOL = \frac{\%\Delta EBIT}{\%\Delta sales}$$

$$DOL = \frac{Q(P-V)}{Q(P-V)-F} = \frac{S-TVC}{S-TVC-F}$$

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$$DFL = \frac{\%\Delta EPS}{\%\Delta EBIT}$$

$$DFL = \frac{EBIT}{EBIT - interest}$$

$$DTL = DOL \times DFL = \frac{Q(P-V)}{Q(P-V)-F-I} = \frac{S-VC}{S-VC-F-I} = \frac{\%\Delta EPS}{\%\Delta sales}$$

breakeven point: $Q_{BE} = \frac{F}{P-V}$

$$\text{EPS after buyback} = \frac{\text{total earnings} - \text{after-tax cost of funds}}{\text{shares outstanding after buyback}}$$

effective tax rate on dividends = corporate tax rate + (1– corporate tax rate)(individual tax rate)

expected rate of return from expectational data: $E(R) = \sum_{i=1}^{n} P_i R_i$

expected rate of return from historical data: $\bar{R} = \frac{\sum_{t=1}^{n} R_t}{n}$

variance of returns from expectational data: $\text{variance} = \sigma^2 = \sum_{i=1}^{n} P_i \left[R_i - E(R)\right]^2$

variance of returns from historical data: $\text{variance} = \sigma^2 = \frac{\sum_{t=1}^{N} \left(R_t - \bar{R}\right)^2}{n}$

covariance from expectational data: $cov_{1,2} = \sum_{i=1}^{n} \left\{P_i \left[R_{i,1} - E(R_1)\right]\left[R_{i,2} - E(R_2)\right]\right\}$

covariance from historical data: $cov_{1,2} = \frac{\sum_{t=1}^{n} \left\{\left[R_{t,1} - \bar{R}_1\right]\left[R_{t,2} - \bar{R}_2\right]\right\}}{n}$

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

$$\sigma_p = \sqrt{w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\sigma_1\sigma_2\rho_{1,2}} \text{ or } \sqrt{w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2Cov_{1,2}}$$

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Formulas

equation of the CML: $E(R_P) = RFR + \sigma_P \left\{ \frac{[E(R_M) - RFR]}{\sigma_M} \right\}$

total risk = systematic risk + unsystematic risk

$$\beta_i = \frac{Cov_{i,mkt}}{\sigma^2_{mkt}}$$

capital asset pricing model (CAPM): $E(R_i) = RFR + \beta_i [E(R_{mkt}) - RFR]$

zero-beta CAPM: $E(R_{stock}) = E(R_{zero\ beta\ portfolio}) + \beta_{stock} [E(R_{market}) - E(R_{zero\ beta\ portfolio})]$

margin call trigger prices:

$$\text{for margin purchases} = P_o \left(\frac{1 - \text{initial margin}}{1 - \text{maintenance margin}} \right)$$

$$\text{for short sales} = P_o \left(\frac{1 + \text{initial margin}}{1 + \text{maintenance margin}} \right)$$

$$\text{price-weighted index} = \frac{\text{sum of stock prices}}{\text{number of stocks}}$$

$$\text{market value-weighted index} = \frac{\sum [(\text{price}_{today})(\text{number of shares outstanding})]}{\sum [(\text{price}_{base\ year})(\text{number of shares outstanding})]} \times \text{base year index value}$$

preferred stock valuation model: $P_0 = \frac{D_p}{k_p}$

one-period stock valuation model: $P_0 = \frac{D_1}{1 + k_e} + \frac{P_1}{1 + k_e}$

infinite period model: $P_0 = \frac{D_0 \times (1+g)}{k_e - g} = \frac{D_1}{k_e - g}$

multistage model: $P_0 = \frac{D_1}{(1 + k_e)} + \frac{P_2}{(1 + k_e)^2} + \ldots + \frac{D_n}{(1 + k_e)^n} + \frac{P_n}{(1 + k_e)^n}$

where :

$$P_n = \frac{D_{n+1}}{k_e - g_c}$$

$E(R) = (1 + RFR_{real})(1 + IP)(1 + RP) - 1$

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$RFR_{nominal} = (1 + RFR_{real})(1 + IP) - 1$

expected growth rate: g = (retention rate)(ROE)

earnings multiplier: $\frac{P_0}{E_1} = \frac{\frac{D_1}{E_1}}{k - g}$

expected EPS = [(sales)(EBITDA%) – depreciation – interest](1 – tax rate)

directional technical indicators:

$$\text{short interest ratio} = \frac{\text{outstanding short interest}}{\text{average daily volume on exchange}}$$

$$\text{uptick-downtick ratio} = \frac{\text{number of block uptick transactions}}{\text{number of block downtick transactions}}$$

"smart money" technical indicators:

$$\text{confidence index} = \frac{\text{quality bond yields}}{\text{average bond yields}}$$

$$\text{specialist short sale ratio} = \frac{\text{specialist's short sales}}{\text{total short sales on the NYSE}}$$

contrarian technical indicators:

$$\text{mutual fund ratio} = \frac{\text{mutual fund cash}}{\text{total fund assets}}$$

$$\text{investment advisor ratio} = \frac{\text{bearish opinions}}{\text{total opinions}}$$

$$\text{volume ratio} = \frac{\text{OTC volume}}{\text{NYSE volume}}$$

stock price and volume techniques:

$$\text{upside-downside volume ratio} = \frac{\text{volume of stocks that increased}}{\text{volume of stocks that declined}}$$

$$\text{relative strength} = \frac{\text{stock price}}{\text{market index value}}$$

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$$\text{trailing P/E} = \frac{\text{market price per share}}{\text{EPS over previous 12 months}}$$

$$\text{leading P/E} = \frac{\text{market price per share}}{\text{forecast EPS over next 12 months}}$$

$$\text{P/V ratio} = \frac{\text{market value of equity}}{\text{book value of equity}} = \frac{\text{market price per share}}{\text{book value per share}}$$

where :
book value of equity = common shareholders' equity
= (total assets – total liabilities) – preferred stock

$$\text{P/CF ratio} = \frac{\text{market value of equity}}{\text{cash flow}} = \frac{\text{market price per share}}{\text{cash flow per share}}$$

$$\text{P/S ratio} = \frac{\text{market value of equity}}{\text{total sales}} = \frac{\text{market price per share}}{\text{sales per share}}$$

CF = net income + depreciation + amortization

$$\text{adjusted CFO} = \text{CFO} + \left[(\text{net cash interest outflow}) \times (1 - \text{tax rate})\right]$$

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