

FORMULAE – PART 2

(following Berk, DeMarzo and Harford's "Fundamentals of Corporate Finance" sequence)

GESTÃO FINANCEIRA I / CORPORATE FINANCE I / GESTÃO FINANCEIRA / CORPORATE FINANCE

$$NPV = FCF_0 + \frac{FCF_1}{1+r} + \dots + \frac{FCF_N}{(1+r)^N} = VAL$$

$$IRR: FCF_0 + \frac{FCF_1}{1+irr} + \dots + \frac{FCF_N}{(1+irr)^N} = 0$$

$$Profitability\ Index = \frac{Value\ Created}{Resource\ Consumed} = \frac{NPV}{Resource\ Consumed} = \frac{VAL}{Recurso\ Consumido} = \text{Índice de Rendibilidade}$$

$$Net\ Working\ Capital = Cash + Inventory + Receivables - Payables = NWC$$

$$Free\ Cash\ Flow = EBIT(1 - Tax\ Rate) + Depreciation - Capital\ Expenditures - \Delta NWC$$

OR

$$Free\ Cash\ Flow = Net\ Income + Interest\ Expense \times (1 - Tax\ Rate) + Depreciation - Capital\ Expenditures - \Delta NWC$$

$$PV(FCF_t) = \frac{FCF_t}{(1+r)^t} = \text{Valor atual do } FCF_t$$

$$Capital\ Gain = Sale\ Price - Book\ Value = Valor\ de\ Venda - Valor\ Contabilístico = Mais\ Valia$$

$$Book\ Value = Purchase\ Price - Accumulated\ Depreciation = Valor\ de\ Aquisição - Depreciações\ Acumuladas = Valor\ Contabilístico$$

$$\begin{aligned} &After - Tax\ Cash\ Flow\ from\ Asset\ Sale = Sale\ Price - Tax\ Rate \times Capital\ Gain \\ &= Cash\ Flow\ líquido\ de\ imposto\ de\ Venda\ de\ Ativo \end{aligned}$$

$$Enterprise\ Value = Market\ Value\ of\ Equity + Debt - Cash$$

$$Discounted\ Free\ Cash\ Flow\ Model: V_0 = PV(\text{Future Free Cash Flow of Firm})$$

$$P_0 = \frac{V_0 + Cash_0 - Debt_0}{Shares\ Outstanding_0}$$

$$V_0 = \frac{FCF_1}{1+r_{wacc}} + \frac{FCF_2}{(1+r_{wacc})^2} + \dots + \frac{FCF_N}{(1+r_{wacc})^N} + \frac{V_N}{(1+r_{wacc})^N}$$

$$V_N = \frac{FCF_{N+1}}{r_{wacc} - g_{FCF}} = \frac{FCF_N \times (1 + g_{FCF})}{r_{wacc} - g_{FCF}}$$

$$Degree\ of\ Operating\ Leverage = DOL = \frac{Q(P - V)}{Q(P - V) - F} = GAO = \text{Grau de Alavanca Operacional}$$

$$Degree\ of\ Financial\ Leverage = DFL = \frac{Q(P - V) - F}{Q(P - V) - F - FinCost} = GAF = \text{Grau de Alavanca Financeira}$$

$$Degree\ of\ Total\ Leverage = DFL = \frac{Q(P - V)}{Q(P - V) - F - FinCost} = GAT = \text{Grau de Alavanca Total}$$

$$\bar{R} = \frac{1}{T}(R_1 + R_2 + \dots + R_T) = \frac{1}{T} \sum_{t=1}^T R_t$$

$$\text{Var}(R) = \frac{1}{T-1} \sum_{t=1}^T (R_t - \bar{R})^2$$

$$\text{SD}(R) = \sqrt{\text{Var}(R)}$$

$$w_i = \frac{\text{value of investment } i}{\text{total value of portfolio}}$$

$$R_p = w_1R_1 + w_2R_2 + \dots + w_NR_N$$

$$E(R_p) = w_1E(R_1) + w_2E(R_2) + \dots + w_NE(R_N)$$

$$\text{cov}(R_i, R_j) = E \left[(R_i - E(R_i)) (R_j - E(R_j)) \right]$$

$$\text{cov}(R_i, R_j) = \frac{1}{T-1} \sum_t (R_{i,t} - \bar{R}_i)(R_{j,t} - \bar{R}_j)$$

$$\text{corr}(R_i, R_j) = \frac{\text{cov}(R_i, R_j)}{\text{SD}(R_i)\text{SD}(R_j)}$$

$$\begin{aligned} \text{Var}(R_p) &= w_1^2\text{Var}(R_1) + w_2^2\text{Var}(R_2) + 2w_1w_2\text{cov}(R_1, R_2) = \\ &= w_1^2\text{Var}(R_1) + w_2^2\text{Var}(R_2) + 2w_1w_2\text{corr}(R_1, R_2)\text{SD}(R_1)\text{SD}(R_2) \end{aligned}$$

$$\beta_i = \frac{\text{SD}(R_i)\text{corr}(R_i, R_{Mkt})}{\text{SD}(R_{Mkt})} = \frac{\text{cov}(R_i, R_{Mkt})}{\text{Var}(R_{Mkt})}$$

$$\text{Capital Asset Pricing Model: } E(R_i) = r_f + \beta_i \times (E[R_{Mkt}] - r_f)$$

$$\beta_p = \frac{\text{cov}(R_p, R_{Mkt})}{\text{Var}(R_{Mkt})} = w_1\beta_1 + w_2\beta_2 + \dots + w_N\beta_N$$

$$\text{Cost of Preferred Stock Capital} = r_p = \frac{\text{Preferred Dividend}}{\text{Preferred Stock Price}} = \frac{\text{Div}_{pfd}}{P_{pfd}}$$

$$\text{CAPM Cost of Equity} = r_E = r_f + \beta_E \times (E[R_{Mkt}] - r_f)$$

$$\text{Constant Dividend Growth Model Cost of Equity} = r_E = \frac{\text{Div}_1}{P_E} + g$$

$$\text{Weighted Average Cost of Capital} = r_{WACC} = \frac{E}{E+P+D}r_E + \frac{P}{E+P+D}r_P + \frac{D}{E+P+D}r_D(1-T_C)$$

$$\text{Net New Financing} = \text{ProForma Assets} - \text{ProForma Liabilities and Equity}$$