

## FORMULAE Part I FÓRMULAS Parte I

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

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

$$PV(\text{growing perpetuity}) = \frac{C}{r - g} = VA(\text{renda perpétua}) \quad (4.7)$$

$$PV(\text{annuity of } C \text{ for } N \text{ periods with interest rate } r, \text{ growing at rate } g) = C \times \frac{1}{r - g} \left( 1 - \left( \frac{1 + g}{1 + r} \right)^N \right) =$$

$$= VA(\text{renda termo inicial } C, \text{ crescente a taxa } g, \text{ durante } N \text{ períodos, atualizada a taxa } r) \quad (4.8)$$

$$1 + EAR = \left( 1 + \frac{APR}{k} \right)^k \quad ; \quad 1 + TAE = \left( 1 + \frac{TAN}{k} \right)^k \quad (5.3)$$

$$YTM_n = \left( \frac{\text{Face Value}}{P} \right)^{\frac{1}{n}} - 1 \quad (6.2)$$

$$P = CPN \times \frac{1}{y} \left( 1 - \frac{1}{(1 + y)^n} \right) + \frac{FV}{(1 + y)^n} \quad (6.3)$$

$$P = PV(\text{Bond/Obrigaç\u00e3o cash Flows}) = \frac{CPN}{1 + YTM_1} + \frac{CPN}{(1 + YTM_2)^2} + \dots + \frac{CPN + FV}{(1 + YTM_N)^N} \quad (6.4)$$

$$r_E = \frac{Div_1}{P_0} + \frac{P_1 - P_0}{P_0} \quad (7.2)$$

$$P_0 = \frac{Div_1}{1 + r_E} + \frac{Div_2}{(1 + r_E)^2} + \dots + \frac{Div_N}{(1 + r_E)^N} + \frac{P_N}{(1 + r_E)^N} \quad (7.4)$$

$$P_0 = \frac{Div_1}{r_E - g} \quad (7.6)$$

$$Div_t = EPS_t \times \text{Dividend Payout Rate}_t \quad (7.8)$$

$$g = \text{Retention rate} \times \text{Return on New Investment} \quad (7.11)$$

$$P_0 = \frac{PV(\text{Future Total Dividends and Repurchases})}{\text{Shares Outstanding}_0} \quad (7.15)$$

## RATIOS RÁCIOS

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Sales}} = \frac{\text{Margem Bruta}}{\text{Vendas}} = \text{Margem Bruta das Vendas}$$

$$\text{EBIT Margin} = \frac{\text{EBIT}}{\text{Sales}} = \frac{\text{EBIT}}{\text{Vendas}} = \text{Margem do EBIT}$$

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}} = \frac{\text{Resultado Líquido}}{\text{Vendas}} = \text{Rendibilidade Líquida das Vendas}$$

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{\text{Ativo Corrente}}{\text{Passivo Corrente}} = \text{Liquidez Geral}$$

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} = \frac{\text{Ativo Corrente} - \text{Inventários}}{\text{Passivo Corrente}} = \text{Liquidez Reduzida}$$

$$\text{Cash Ratio} = \frac{\text{Cash or Cash\&Equivalents}}{\text{Current Liabilities}} = \frac{\text{Caixa ou Caixa\&Equivalentes}}{\text{Passivo Corrente}} = \text{Liquidez Imediata}$$

$$\text{Accounts Receivable Days} = \frac{\text{Accounts Receivable}}{\text{Average Daily Sales}} = \frac{\text{Contas a Receber}}{\text{Vendas Diárias (média)}} = \text{Prazo Médio Recebimentos}$$

$$\text{Accounts Payable Days} = \frac{\text{Accounts Payable}}{\text{Average Daily Cost of Sales}} = \frac{\text{Contas a Pagar}}{\text{CMVMC Diário (médio)}} = \text{Prazo Médio Pagamentos}$$

$$\text{Inventory Days} = \frac{\text{Inventory}}{\text{Average Daily Cost of Sales}} = \frac{\text{Inventários}}{\text{CMVMC Diário (médio)}} = \text{Prazo Médio Permanência Inventários}$$

$$\text{Inventory Turnover} = \frac{\text{Annual Cost of Sales}}{\text{Inventory}} = \frac{\text{CMVMC Anual}}{\text{Inventários}} = \text{Rotação de Inventários}$$

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT or EBITDA}}{\text{Interest Expense}} = \frac{\text{EBIT ou EBITDA}}{\text{Encargos Financeiros com a dívida}} = \text{Cobertura Encargos Financeiros Dívida}$$

$$\text{Debt/Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Equity}} = \frac{\text{Dívida Total}}{\text{Capital Próprio}} = \text{Rácio Dívida/Capital Próprio}$$

$$\text{Debt - to - Capital Ratio} = \frac{\text{Total Debt}}{\text{Total Equity} + \text{Total Debt}} = \frac{\text{Dívida Total}}{\text{Capital Próprio} + \text{Dívida Total}} = \text{Grau de Endividamento Total}$$

$$\text{Equity Multiplier (at book values)} = \frac{\text{Total Assets}}{\text{Equity}} = \frac{\text{Total do Ativo}}{\text{Capital Próprio}} = \text{Multiplicador do Capital Próprio (a valores contabilísticos)}$$

$$\text{Market - to - Book Ratio} = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}} = \frac{\text{Valor de Mercado do Capital Próprio}}{\text{Valor Contabilístico do Capital Próprio}}$$

$$\text{Price - Earnings Ratio} = \frac{\text{Share Price}}{\text{Earnings per Share}} = \frac{\text{Cotação da Ação}}{\text{Resultado por Ação}} = \text{PER}$$

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}} = \frac{\text{Vendas}}{\text{Total do Ativo}} = \text{Rotação do Ativo}$$

$$\text{ROE} = \frac{\text{Net Income}}{\text{Book Value of Equity}} = \frac{\text{Resultado Líquido}}{\text{Valor Contabilístico Capital Próprio}}$$

$$\text{ROA} = \frac{\text{Net Income} + \text{Interest Expense}}{\text{Book Value of Assets}} = \frac{\text{Resultado Líquido} + \text{Encargos Financeiros com Dívida}}{\text{Valor Contabilístico do Ativo}}$$

$$\text{ROIC} = \frac{\text{EBIT}(1 - \text{Tax Rate})}{\text{Book Value of Equity} + \text{Net Debt}} = \frac{\text{EBIT}(1 - \text{Taxa de Imposto})}{\text{Valor Contabilístico Capital Próprio} + \text{Net Debt}}$$

## FORMULAE Part II FÓRMULAS Parte II

(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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\begin{aligned} Var(R_p) &= w_1^2Var(R_1) + w_2^2Var(R_2) + 2w_1w_2cov(R_1, R_2) = \\ &= w_1^2Var(R_1) + w_2^2Var(R_2) + 2w_1w_2corr(R_1, R_2)SD(R_1)SD(R_2) \end{aligned}$$

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

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

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

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

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

$$\text{Constant Dividend Growth Model Cost of Equity} = r_E = \frac{Div_1}{P_E} + g$$

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

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