

## FORMULA SHEET FOR FINANCIAL CONCEPTS

### Financial Ratios

- Return on Equity (ROE): Net Income / Equity
- Return on Assets (ROA): (Net Income + interest) / Equity
- Asset Turnover: Sales / Assets
- Inventory Turnover: Cost of Goods Sold / Inventory
- Average Days in Inventory: Inventory / Daily Cost of Goods Sold
- Receivables Turnover: Sales / Receivables
- Average Collection Period: Receivables / Average Daily Sales
- Operating Profit Margin: (net income + interest) / sales
- The Du Pont System: ROA = Asset Turnover x Operating Profit Margin
- Long-term Debt Ratio: long-term debt / (long-term debt + long-term debt + equity)
- Total Debt Ratio: total liabilities / total assets
- Times Interest Earned: EBIT / Interest Payments
- Net Working Capital: current assets – current liabilities
- Current Ratio: current assets / current liabilities
- Quick Ratio: (cash + marketable securities + receivables) / current liabilities
- Cash Ratio: (cash + marketable securities) / current liabilities

### The Time Value of Money

1. Future value = present value x  $(1+r)^t$
2. Present Value = future value /  $(1+r)^t$
3. PV of perpetuity =  $C/r$  = Cash payment / interest rate
4. PV of t-year annuity =  $C \left[ \frac{1}{r} - \frac{1}{r(1+r)^t} \right]$
5. PV of annuity due =  $(1+r) \times$  PV of annuity
6. FV of annuity of \$1 a year = PV of annuity of \$1 a year x  $(1+r)^t = \frac{(1+r)^t - 1}{r}$
7. FV of annuity due = FV of ordinary annuity x  $(1+r)$

### Valuing Bonds

1. Bond Price = PV(coupons) + PV(face value)
2. Bond rate of return = (coupon income + price change) / investment

### Valuing Stocks

1.  $P_0 = \frac{DIV_1 + P_1}{1+r}$
2.  $P_0 = \frac{DIV_1}{1+r} + \frac{DIV_2}{(1+r)^2} + \dots + \frac{DIV_H + P_H}{(1+r)^H}$
3.  $P_0 = \frac{DIV_1}{r-g}$
4.  $r = \frac{DIV_1}{P_0} + g =$  dividend yield + growth rate
5.  $g =$  sustainable growth rate = return on equity x plowback ratio

## NPV and Other Investment Criteria

1. NPV = PV – required investment
2. Equivalent Annual Annuity = PV of costs / annuity factor
3. Profitability Index = NPV / Initial Investment

## Estimating Cash Flows

1. Total Cash Flow = CFs from capital investments + CFs from changes in working capital + operating CFs
2. Operating CF = revenues – cash expenses – taxes
3. Operating CF = after-tax profit + depreciation
4. Operating CF = (revenues – cash expenses) x (1 – tax rate) + (tax rate x depreciation)

## Debt Policy

1.  $r_{equity} = r_{assets} + \frac{D}{E}(r_{assets} - r_{debt})$
2. PV tax shields = annual tax shield /  $r_{debt} = \frac{T_c \times (r_{debt} \times D)}{r_{debt}} = T_c D$
3. Value of levered firm = value if all-equity-financed +  $T_c D$

## Risk, Return and the Opportunity Cost of Capital

1. Percentage Return = (capital gain + dividend) / initial share
2. Variance = average of squared deviations from mean
3. Standard deviation = square root of variance
4. Portfolio rate of return =  
(fraction of portfolio in first asset x rate of return on first asset) +  
(fraction of portfolio in second asset x rate of return on second asset)

## Risk, Return and Capital Budgeting

1. Beta of portfolio = (fraction of portfolio in first stock x beta of first stock) +  
(fraction of portfolio in second stock x beta of second stock)
2. Expected return = risk-free rate + risk premium  
$$r = r_f + \beta(r_m - r_f)$$

## The Weighted Average Cost of Capital

1.  $WACC = \left[ \frac{D}{V}(1 - T_c)r_{debt} \right] + \left( \frac{E}{V}r_{equity} \right)$
2.  $WACC = \left[ \frac{D}{V}(1 - T_c)r_{debt} \right] + \left( \frac{P}{V}r_{preferred} \right) + \left( \frac{E}{V}r_{equity} \right)$
3.  $r_{equity} = \frac{DIV_1}{P_0} + g$
4.  $r_{preferred} = \frac{\text{dividend}}{\text{price of preferred}}$