

Formulas and Definition of Variables

Unless otherwise stated, when ratios involve a comparison of income statement values to balance sheet values, the balance sheet values should be the average of the beginning and ending balances.

Financial Ratios

Accounts Receivable Turnover:

Sales \div Accounts receivable

Average Annual Growth Rate (AAGR):

Example: AAGR of Sales

{Sum of all Periods [(Current year sales \div Prior year sales) – 1] \div # of periods analyzed} \times 100

Average Collection Period:

365 days \div Accounts Receivable Turnover

Compound Annual Growth Rate (CAGR):

Example: CAGR of Sales

{[(Current year sales \div Base year sales)^(1 \div # of Periods analyzed)] – 1} \times 100

Current Ratio

Current assets \div Current liabilities

Debt-free Working Capital Turnover

Sales \div Debt-free working capital

Dividend Payout Ratio

Dividends paid \div Net income

DuPont Formula (Net income \div Equity) = (Net income \div Sales) \times (Sales \div Assets) \times (Assets \div Equity)

EVA Formula (Economic Value Added)

EVA = NOPAT – \$ WACC

EVA = EBIT \times (1 - t) - WACC \times capital invested

EVA = (Equity) \times (ROE – Ke)

Fixed-Charge Coverage

(Net income before taxes + Interest charges + Long-term lease payments) \div (Interest charges + Long-term lease payments)

Gross Profit Margin

Gross profit \div Net sales

Interest-bearing Debt to Equity

Interest-bearing debt ÷ Total equity

Inventory Turnover

Cost of goods sold ÷ Inventory

Long-term Debt to Equity

Long-term debt ÷ Total equity

Net Profit Margin

Net income after tax ÷ Net Sales

Operating Profit Margin

Operating profit ÷ Net sales

Pretax Income to Sales

Pretax income ÷ Net sales

Pretax Return on Assets

Pretax income ÷ Total assets

Pretax Return on Common Equity

Pretax Income ÷ Common equity

Quick (Acid-test) Ratio (Cash + Cash equivalents + Short-term investments, e.g., marketable securities, + Receivables) ÷ Current liabilities

Return on Common Equity

Net income ÷ Common equity

Return on Investment

Net income + Interest (1 - Tax rate) ÷ (Equity+ Long-term debt)

Return on Total Assets Net income + Interest (1 - Tax rate) ÷ Total Assets

Sales to Fixed Assets (Fixed Asset Turnover)

Sales ÷ Fixed assets

Sales to Total Assets (Total Asset Turnover)

Sales ÷ Total assets

Times Interest Earned

Earnings before interest and taxes ÷ Interest expense

Total Debt to Total Assets

Total debt ÷ Total assets

Total Debt to Total Equity

Total debt ÷ Total equity

Total Equity to Total Assets

Total equity ÷ Total assets

Working Capital Turnover

Sales ÷ (Current assets – Current liabilities)

Valuation Formulas and Notation System After-Tax Cost of Debt

k_d = Marginal Borrowing Rate (1–Marginal Tax Rate)

Beta

$B_U = B_L \div \{1 + [(1-t)(W_d/W_e)]\}$

$B_R = B_U\{1 + [(1-t)(W_d/W_e)]\}$

Build-up Method

$k_e = R_f + (RP_m) + RP_s + RP_u$

Capitalization Rate

Cap Rate = Discount Rate – Long-Term Growth Rate

CAPM Capital Asset Pricing Model (Theoretical)

$k_e = R_f + B(RP_m)$

Modified CAPM Capital Asset Pricing Model (used to value smaller businesses)

$k_e = R_f + B(RP_m) + RP_s + RP_u$

Weighted Average Cost of Capital (WACC)

$WACC = W_e(k_e) + W_d(k_d)$

Definition of Variables

PV = Present Value.

Cost of capital and rate of return variables:

B = Beta. A coefficient, usually used to modify a rate of return variable. Betas from public companies are levered betas.

B_L = Levered beta.

B_U = Unlevered beta.

B_R = Relevered beta.

k_e = Discount rate for common equity capital (cost of common equity capital). Unless otherwise stated, it generally is assumed that this discount rate is applicable to net cash flow available to common

equity. Also expressed as k_i or as $E(R_i)$, expected rate of return on security i .

k_d = After-tax cost of debt.

R_f = Risk-free rate. The rate of return available in the market on an investment that is free of default risk.

RP_m = Equity risk premium for the "market" (large company premium). Usually used in the context of a market for equity securities, such as NYSE or S&P 500. Return in excess of risk-free rate.

RP_s = Risk premium for "small" stock (small stock premium), over and above RP_m (e.g., average size of lowest quartile of NYSE as measured by market value of common equity).

RP_u = Risk premium for unsystematic risk attributable to the specific company (specific company risk).

t = Tax rate (expressed as a percentage of pretax income).

Income variables:

EBIT = Earnings before interest and taxes.

EBITDA = Earnings before interest, taxes, depreciation, and amortization.

NCF = Net cash flow (to equity or to invested capital).

Weightings:

W_e = Weight of common equity in capital structure.

W_d = Weight of debt in capital structure.

Growth:

g = Long-term rate of growth.