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Finance Basics

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Basic concepts

- Assets = Liabilities + Shareholder's equity
- Assets – Comes in left side of balance sheet
- Liabilities and shareholder's equity – Comes in right side of balance sheet

Cash Flows

- ***Cash flow from assets*** = Cash flow to creditors (bondholders) - Cash flow to stockholders (owners)
- or
- ***Cash flow from assets*** = Operating cash flow - Net capital spending - Change in net working capital (NWC)
- where:
- *Operating cash flow* = Earnings before interest and taxes (EBIT) - Depreciation - Taxes
- *Net capital spending* = Ending net fixed assets - Beginning net fixed assets - Depreciation
- *Change in NWC* = Ending NWC = Beginning NWC
- ***Cash flow to creditors*** = Interest paid - Net new borrowing
- ***Cash flow to stockholders*** = Dividends paid - Net new equity raised

Financial Forecasting and Planning

- **Payout ratio** = cash dividends/net income
- **Retention ratio** = retained earnings/net income or (1-payout ratio)
- **Internal growth rate = (**ROA x retention ratio) / (1-ROA x retention ratio). The internal growth rate is the maximum growth rate that can be achieved with no external financing of any kind.
- **Sustainable growth rate** = (ROE x retention ratio) / (1-ROExretention ratio). The sustainable growth rate is the maximum growth rate that can be achieved with no external equity financing while maintaining a constant debt–equity ratio.

Financial Ratios

Liquidity / Short-term solvency

- **Current rat**io = total current assets/ total current liabilities
- **Quick ratio** = quick assets or current assets – inventory – prepaid expenses/ total current liabilities.
- **Working capital =** current assets – current liabilities
- **Cash ratio** = cash / current liabilities
- **Net working capital to total assets =** Net working capital / Total assets
- **Interval measure =** Current assets / Average daily operating costs

Profitability ratios

- **Gross profit Margin =** Gross profit / Sales (operating revenue)
- **Net Profit margin**: = net income / Sales (operating revenue)
- **Net (gross) ROA** = net income / average total assets.
- **ROA** = profit margin x asset turnover
- **ROE** = net income/ average stockholders' equity
- **ROE =** profit margin x asset turnover x equity multiplier (Du-Pont Analysis)

Activity ratios

- **Total asset turnover** = Sales (operating revenue) / total assets(average)
- **Receivables turnover** = Sales (operating revenue) /Receivables (average)
- **Average collection period** = Days in period or 365 days /Receivables turnover
- **Inventory turnover** = cost of goods sold/inventory(average)
- **Days in inventory** = Days in period or 365 days / inventory turnover
- **NWC turnover =** Sales / NWC

Financial leverage / solvency ratio:

- **Debt ratios**: **debt ratio** = debt/assets;
- **Debt-to-equity ratio; equity multiplier** = assets/ equity
- **Times interest earned / Interest coverage** = EBIT/ interest expense
- **Long term debt ratio =** Long term debt / (Long term debt + total equity)
- **Cash coverage ratio =** EBIT + Depreciation / Interest

Value / Market ratios: the value of the firm

- **P/E ratio:** current price of share / Earnings per share
- **PEG ratio =** Price earning ratio / Earnings growth rate
- **Price sales ratio =** Price per share / Sales per share
- **EPS:** Net Income / Outstanding shares
- **Dividend yield** = dividend per share/ market price per share.
- **Market-to-book value:** Market value per share / Book value per share
- **Tobin Q's ratio =** Market value of assets / replacement cost of assets

Time Value of Money

refers to the fact that a dollar in hand today is worth more than a dollar promised at some time in the future.

Future value and Compounding

- Investing for single period
  - Simple interest is applicable
  - Investment will grow at (1+rate) per dollar invested
- Investing more than single period
  - Apply compound interest – (Reinvestment i.e. Interest on Interest)

Future value

- **Value of money in future**
  Future value=Present value x $(1+rate)^{time}$
  whereas $(1+rate)^{time}$ is called as FVIF (can be derived from table-FVIF)
- ***Formula to calculate FV in excel***
  =FV(rate,nper,pmt,pv,fv,[type])
- The present value or all cash outflows are written in minus
- Where N / Nper = Period , I/Y / rate= Interest rate, PMT = Annuity, PV = Present Value, FV = Future value Type = 1 is beginning of period and 0 is end of period ,

Present value

- **Present value or worth of money**

$$\text{Present value} = \frac{\text{Future value}}{(1+\text{rate})^{\text{time}}}$$

- ***Using table value***
  Present value=Present value x PVIF
- ***Formula to calculate PV in excel***
  =PV(rate,nper,pmt,pv,fv,[type])
- Where N / Nper = Period , I/Y / rate= Interest rate, PMT = Annuity, PV = Present Value, FV = Future value Type = 1 is beginning of period and 0 is end of period ,

Annuity

Present value of Annuity:

$$Annuity\ present\ value = Cash\ flows\ x\ \frac{(1-[1/(1+rate)^{time}])}{rate}$$

$\frac{(1-[1/(1+rate)^{time}])}{rate}$ *value can be derived from PVIFA table*

Formula to calculate Annuity in excel

=PMT(rate,nper,pmt,pv,fv,[type])

Future value of Annuity:

$$Annuity\ future\ value = Cash\ flows\ x\ \frac{(1-[1x(1+rate)^{time}])}{rate}$$

$\frac{(1-[1x(1+rate)^{time}])}{rate}$ *value can be derived from FVIFA table*

Annuity due value:

Ordinary annuity value x (1 + rate)

Perpetuity

$$PV\ of\ perpetuity = \frac{Cash\ flows}{rate}$$

Growing annuities and perpetuities:

$$Growth\ annuity\ present\ value = Cash\ flows\ x\ \frac{1-(\frac{(1+growth)}{(1+rate)})^{time}}{rate-growth}$$

$$Growth\ perpetuity\ present\ value = \frac{Cash\ flows}{rate-growth}$$

Annual Percentage rate, Effective annual rate:

$$EAR = \left(1+\left(\frac{Annual\ rate}{times}\right)^{times}\right)-1$$

Bond and Bond Valuation

Borrowing money from public for long term by issuing debt securities is called **bonds**

Regular / stated interest payment promised on bonds is **coupons**

Amount at which the bond will be repaid is **face value or par value**

Annual coupon dividend divided by face value of bond is **coupon rate**

Specified period on which the principal bond is paid is **Maturity**

rate required in the market on the bond is **yield to maturity (YTM)**

Real Rate and Nominal Rate

- Nominal rates are called "nominal" because they have not been adjusted for inflation. Real rates are rates that have been adjusted for inflation.
- **Fisher effect:** Relation between the real rate, inflation and nominal rate

$$1 + real\ rate = (1 + real\ rate) * (1 + inflation)$$

Value of bond

$$Bond\ value = coupon\ paid\ each\ period * \left[\frac{1-\frac{1}{(1+rate)^{number\ of\ periods}}}{rate} + \frac{Face\ value}{(1+rate)^{number\ of\ periods}}\right.$$

Different excel related to time value of money can be used to calculate different concepts of bonds.

Stock Valuation

Dividend growth model

A model that determines the current price of a stock as its dividend next period divided by the discount rate less the dividend growth rate

$$Current\ price\ of\ stock = \frac{Dividend\ at\ period\ 1}{(required\ rate - growth)}$$

$$P_0 = \frac{D_1}{(r-g)}$$

Calculating required rate of return = $\frac{D_1}{P_0} + g$

Dividend and capital yield

$$Dividend\ yield = \frac{D_1}{P_0}$$

Capital yield is growth rate

Or

$$Capital\ gain\ yield = \frac{P_{t+1} - P_t}{P_t}$$

Capital Budgeting

Operating cash flows	• Earnings before interest and taxes + Depreciation – taxes
Bottom up approach	• Net Income + Depreciation
Top bottom approach	• Sales – costs – taxes
Tax shield approach	• OCF = (Sales – Costs) x (1-tax rate) + Depreciation x tax rate

Break-even analysis

Ignoring taxes	• Sales volume = $\frac{\text{Fixed cost+Operating cash flows}}{\text{Price per unit–variable cost per unit}}$
Accounting break-even	• Sales volume = $\frac{\text{Fixed cost+Depreciation}}{\text{Price per unit–variable cost per unit}}$
Cash break-even	• Sales volume = $\frac{\text{Fixed cost}}{\text{Price per unit–variable cost per unit}}$
Financial break-even	• Sales volume = $\frac{\text{Fixed cost+Operating cash flows}}{\text{Price per unit–variable cost per unit}}$

	Decision Rule	Formula / Excel formula	Advantage	Disadvantage
Payback Rule	Want a low number = quick time to recover money	Period in which the cash inflows recovers the investment	Simple and intuitive	Arbitrary cutoff number, simple version does not account for time value of money
IRR	Accept project if IRR > cost of capital	=IRR(cash flows)	Intuitive; Accounts for time value of money; Provides value of project in relative terms (return)	May not rank projects correctly; for non-standard cash flows, may have multiple IRRs
NPV	Accept project if NPV > 0	NPV = PV of cash flows from period 1 – Initial investment =NPV(Cash flows)-Initial initial investment	Accounts for time value of money; Provides value of project in dollar terms	
Profitability Index	Accept project if NPV > 1	PI = PV of cash flows / Initial investment	Accounts for time value of money	May not rank projects correctly