# 1 Free Cash Flow

**OPTION A:**

$$\begin{array}{r} \text{NOPAT} = \text{EBIT}\ (1-T) \\ + \text{ Depreciation ex.Amortization} \\ - \text{ CapEx} \\ - \Delta \text{ non-cash WC} \\ \hline \text{FCF} \end{array}$$

$\text{CapEx} = PPE_t - PPE_{t-1} + \text{Depreciation}$

$\text{WC} = \text{CA} - \text{CL} \implies \Delta\text{WC} = \Delta\text{CA} - \Delta\text{CL}$

*Common Current Assets:*

1. Cash and Cash Equivalents
2. Marketable Securities
3. Accounts Receivable
4. Inventory
5. Prepaid Expenses

*Common Current Liabilities:*

1. Accounts Payable
2. Accrued Expenses
3. Short-term Debt
4. Current Portion of Long-term Debt
5. Unearned Revenue

**OPTION B:**

$$\begin{array}{r} \text{Net Income} \\ + \text{ Depreciation ex.Amortization} \\ - \text{ CapEx} \\ - \Delta \text{ non-cash WC} \\ + \text{ Interest Expense}\ (1-T) \\ \hline \text{FCF} \end{array}$$

# 2 Unlevered Beta

$$\beta_l = \beta_u \times \left[1 + \frac{D}{E}(1-T)\right]$$

$$\beta_u = \beta_l \div \left[1 + \frac{D}{E}(1-T)\right]$$

$\beta_l$ is the CAPM equity beta.
$\beta_u$ only captures *business* risk.

**From practice problems:**

Step 1: Calculate $\beta_u$ ***using comps***

Step 2: Sub $\beta_u^{step1}$ into ***firm*** $\beta_l$

Note: Step 2 is when you "lever up" the unlevered beta from step 1 with your own firm's D/E ratio.

If the private firms equity beta, $\beta_l^{step2}$, is *lower* than the public comparable firms average equity beta $\implies$ the private firm has *lower* leverage (i.e., a smaller $\frac{D}{E}$).

Step 3: Cost of Equity, Cost of Debt

Step 4: WACC

# 3 Cost of Capital

$$\text{WACC} = \left(\frac{E}{V}\right) R_e + \left(\frac{D}{V}\right) R_d \times (1-T)$$

where:

- $E$ = Market value of the equity
- $V$ = Total market value of the firm's financing (Equity + Debt)
- $R_e$ = Cost of equity
- $D$ = Market value of the debt
- $R_d$ = Cost of debt
- $T$ = Corporate tax rate

$R_e \overset{\text{CAPM}}{=} R_f + \beta_l(1 - R_f)$

$R_d$ = Observable based on corporate debt issuance (e.g. the aggregate YTM on BBB rated bonds).

# 4 VC stuff

## 4.1 Required % Ownership

- Discount Terminal Value at required rate of return, $r$: $\frac{\text{EBITDA @ Exit}}{(1+r)^N}$
- Calculate $\frac{\text{VC financing}}{\text{Discounted Terminal Value}}$

Final answer is the second bullet point. If asked for equity conversion value, plug all necessary information into Excel using =FV($r$, N years, $q$*PV, PV).

## 0.2 IRR calculations

**a)** common stock w/o CF

EV @ $t$ = EBITDA$_t$ * multiple$_t$

net EV @ $t$ = EV$_t$ − Debt + Cash

$V_e$ = [ net EV @ $t$ ] * % own

$\text{IRR} \overset{\text{Cash Sweep*}}{=} \left(\frac{V_e \text{ @ Exit}}{V_e \text{ @ Purchase}}\right)^{1/N} - 1$

*cash sweep means no dividends.

- ☐ net EV @ exit
- ☐ req. % ownership (% own)
- ☐ find $V_e$ @ exit and $V_e$ @ purchase
- ☐ calculate IRR by hand

b) Convertible Debt w/ CF

$\text{IRR} \overset{\text{xlxs}}{=} \text{IRR(-VC funding, CF)}$

where: the final CF is adjusted by adding the *equity conversion @ exit.*

conversion @ exit = % * [net EV @ exit]

- ☐ VC funding
- ☐ equity conversion @ exit (dollars)
- ☐ Lay out the cashflows from Year 0 through Year X
- ☐ calculate IRR in Excel

c) Preferred Stock

$\text{IRR} \overset{\text{xlxs}}{=} \text{IRR(-VC funding, CF)}$

where: the final CF is adjusted by adding *principal returned @ exit.*

principal returned = % * VC funding

- ☐ VC funding
- ☐ Lay out the cashflows from Year 0 through Year X
- ☐ calculate IRR in Excel

**(b) and (c) including warrants:**
simply adjust the final CF again...

- add: equity obtained @ exit via exercising warrants
- subtract: cost of exercising warrants

eq. obtained @ exit = % * [net EV @ exit]

## 0.3 Runs of Financing

Each round of VC funding involves some dilution of ownership of previous rounds.

Example:

- a Series B investment involves issuing 5 million shares, the ownership of Series A investors drops to 20%
- The retention percentage of Series A investors is 0.20/.25 = 80% and dilution is (0.25-.20)/.25 = 20%

# 5 M&A stuff

## 5.1 Synergies

Revenue Synergies: increase selling power, expand market share, boost sales by selling complements.

Cost Synergies: supply discounts, eliminate redundancy to lower operational costs.

## 5.2 Combined Firm Value

$A + T + S$, where:

- \$A = acquirer's pre-deal equity value
- \$T = target's pre-deal equity value
- \$S = synergies

## 5.3 Accretion vs. Dilution

**ACCRETIVE:**
Combined EPS > acquirers stand-alone

**DILUTIVE:**
Combined EPS < acquirers stand-alone

Acquirer share price increases after the acquisition if:

$$\frac{A+T+S}{\text{N}_A + x} < \frac{A}{\text{N}_A}$$

where:

- N$_A$ = acquirer's pre-deal shares out.
- N$_T$ = target's pre-deal shares out.
- acquirer "tenders" (issues) $x$ new shares to pay for the target.