

1 Free Cash Flow

OPTION A:

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

CapEx = $PPE_t - PPE_{t-1}$ + Depreciation
WC = CA - 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

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

β_l is the CAPM equity beta.
 β_u only captures *business* risk.

From practice problems:

- Step 1: Calculate β_u *using comps*
- Step 2: Sub β_u^{step1} into *firm* β_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, β_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

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

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 $=\text{FV}(r, N \text{ years}, q * \text{PV}, \text{PV})$.

4.2 IRR calculations

a) common stock w/o CF

$$\text{EV @ } t = \text{EBITDA}_t * \text{multiple}_t$$
$$\text{net EV @ } t = \text{EV}_t - \text{Debt} + \text{Cash}$$
$$V_e = [\text{net EV @ } t] * \% \text{ own}$$

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

*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

$\text{IRR}^{\text{.xlxs}} \equiv \text{IRR}(\text{-VC funding, CF})$
where: the final CF is adjusted by adding the *equity conversion @ exit*.

$$\text{conversion @ exit} = \% * [\text{net EV @ exit}]$$

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

c) Preferred Stock

$\text{IRR}^{\text{.xlxs}} \equiv \text{IRR}(\text{-VC funding, CF})$
where: the final CF is adjusted by adding *principal returned @ exit*.

$$\text{principal returned} = \% * \text{VC funding}$$

- ☐ 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

$$\text{eq. obtained @ exit} = \% * [\text{net EV @ exit}]$$

4.3 Runs of VC Financing

- if a VC purchases 5 million shares of the 20 million shares outstanding in a Series A funding round, then its initial percentage ownership is 25%
- if a Series B investment involves issuing 5 million shares, ownership of Series A investors drops to 20%
- The retention percentage of Series A investors is $0.20 / .25 = 80\%$

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 deals:

Combined EPS > acquirers stand-alone

dilutive deals:

Combined EPS < acquirers stand-alone

Acquirer share price increases after the acquisition if:

$$\frac{A + T + S}{N_A + x} < \frac{A}{N_A}$$

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.