LISBON SCHOOL OF ECONOMICS & MANAGEMENT
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Valuation: Intrinsic value or fundamental value

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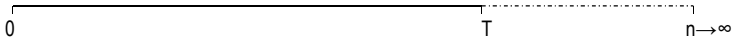
Intrinsic value or fundamental value

- actual value of a company or an asset based on an underlying perception of its true value including all aspects of the business, in terms of both tangible and intangible factors.
- This value may or may not be the same as the current market value
- It is ordinarily calculated by the present value of the future income generated by the asset/company

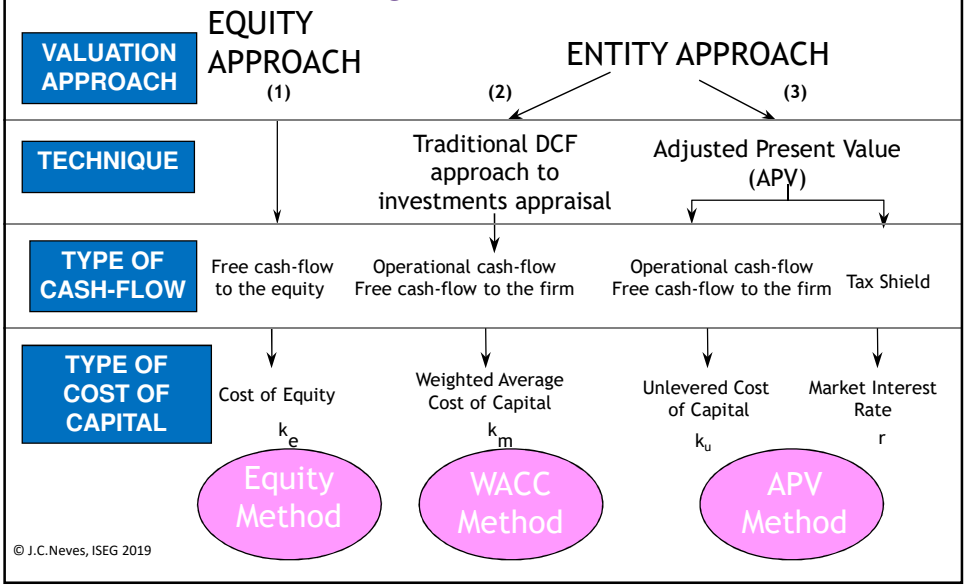
Discounted Cash Flow Valuation
General formula

$$V_0 = \sum_{i=0}^{n} \frac{CF_i}{(1+k)^i} = \sum_{i=0}^{T} \frac{CF_i}{(1+k)^i} + \frac{TV_T}{(1+k)^T}$$



V_0 – Present value of future cash flows
CF_i – cash flow for year i (definition of cash flow?)
k – Cost of capital adjusted to risk (definition of cost of capital?)
TV_T – Terminal value, (residual or de continuing) at year T
T – Last year of annual forecast

Three models of DCF



Agenda for learning about DCF valuations

- Cost of capital
  - Cost of equity
  - Cost of debt
  - Cost of prefered equity
  - Weighted average cost of capital (WACC)
  - Unlevered cost of capital
- Types of cash flow
  - Free cash flow to the equity
  - Free cash flow to the firm (Net operational cash flow)
- Terminal value approaches
- DCF methods
  - The equity method
  - WACC method
  - APV method
- Other complex situations

The CIA course has already addressed this issue

A reminder of the models most used in practice to estimate the cost of equity (ke)

*** CAPM**

$$k_e = r_f + \beta\left(r_m - r_f\right)$$

r_f = Risk free rate of return
B = Beta
r_m= Market return
r_m-r_f = Market risk premium

*** THE GORDON MODEL**

$$k_e = \frac{d_1}{P_0} + g$$

d_1 = Dividend per share year 1
P_0 = Share price year 0
g = Growth rate in the long term

*** THE MODIGLIANI & MILLER (M&M) MODEL**

$$k_e = k_u + \left(k_u - k_d\right) \times \frac{D}{E} \times \left(1 - t\right)$$

k_u - Unlevered cost of capital
D - Debt
E - Equity
t - Corporate income tax rate

*** INTUITIVE MODELS**

$$k_e = k_d + \rho$$
$$k_e = r_f + \eta$$

k_d = Cost of debt
ρ= Risk premium over debt
η = Risk premium over Treasury Bonds

A reminder on the Cost of debt
Ranked by best practice

- The company has bonds quoted:
  - Use the yield to maturity
- The company has a rating but no bond is quoted:
  - Use yield to maturity of identical risk bonds
- No bonds are quoted and no rating:
  - Interets rate of next loan
  - Interest rate of most recent loan
  - Estimate a syntetic rating base on Times interest earning
  - Average cost of debt

A reminder on the cost of prefered shares

- No growth of dividends:
  - = dividends/Price
- Constant growth of dividends:
  - = (Dividends/Price) + g
- If there are special rights
  - Use the options theory

A reminder on hybrid securities

- Decompose the security into equity and debt

A reminder on WACC (km)

$$k_m = k_e \frac{E}{C} + k_p \frac{E_p}{C} + k_d \frac{D}{C}(1-t)$$

$$k_m = k_u \cdot \left(1 - t \frac{D}{C}\right)$$

E – Equity based on ordinary shares
E_p – Equity based on preferred shares
D – Debt
C = Invested Capital = $E+E_p+D$
t = Tax rate

Reminder on Unlevered cost of capital (ku)

- CAPM

$$k_u = r_f + \beta_u\left(r_m - r_f\right)$$

- MODIGLIANI & MILLER

$$k_u = \frac{k_m}{1 - t \times \frac{D}{D+E}}$$

Hamada Formula:

$$\beta_u = \frac{\beta_e + \beta_D\left(D/E\right)}{1 + D/E\,(1-t)}$$

Hamada Formula Simplified:

$$\beta_U = \frac{\beta_E}{1 + \frac{D}{E}(1-t)}$$

$$k_u = \frac{k_e + \frac{D}{E}k_d\left(1-t\right)}{1 + \frac{D}{E}\left(1-t\right)}$$

2. Types of cash flows

Free cash flow ou Free cash flow to the equity

+ Net profit
+ Amortizations & Depreciations
+ Provisions
+ Impairments
+/- Regularizations
- Increase of working capital requirements
- Capex
+ New loans
- Reimbursement of capital loans

Operational cash flow or Free cash flow to the firm

+ Operational income
- Tax on operational income
= NOPAT (Net Operating Profit After Taxes)
+ Amortization and depreciation
+ Provisions
+ Impairment
+/- Regularizations
- Increase of working capital requirements
- Capex

3. Methods to estimate terminal value

Methods to estimate terminal value

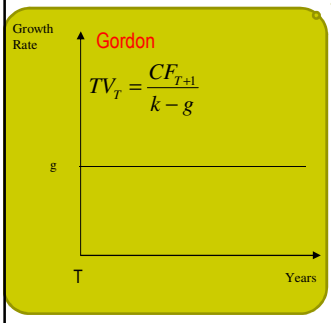
- Discounted cash flow models
  - No growth model
  - Constant growth model (Gordon)
  - Two phases of constant growth model (Malkiel)
  - Three phases of constant growth model (H of Fuller and Hsia)
- Relative valuation
- Cost approach

Terminal value: DCF Models

This is the most used in practice

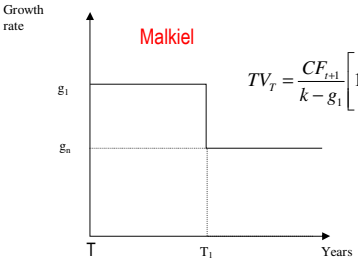
Gordon

$$TV_T = \frac{CF_{T+1}}{k-g}$$



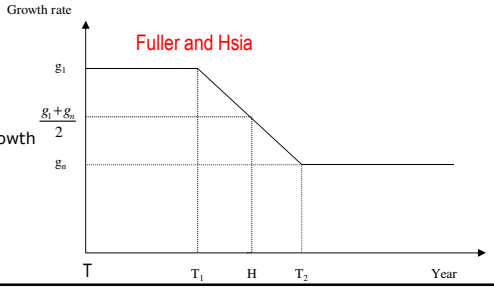
Malkiel

$$TV_T = \frac{CF_{t+1}}{k-g_1}\left[1-\frac{g_1-g_n}{k-g_n}\left(\frac{1+g_1}{1+k}\right)^{T-1}\right]$$



Fuller and Hsia

$$TV_T = \underbrace{\frac{CF_T(1+g_n)}{k-g_n}}_{\text{Stable growth}} + \underbrace{\frac{CF_T \cdot H \cdot (g_1-g_n)}{k-g_n}}_{\text{Supra-normal growth}}$$



$$H = \frac{T_1 + T_2}{2}$$

The g (growth rate) in levered an unlevered models

$$g_L = g_U \times \left(1 + \frac{D}{E}\right)$$

Where:

g_L – growth rate of the levered firm
g_U – growth rate of the unlevered firm
D - Debt
E - Equity

Cautions

- Terminal may represent 60% to 80% of company value or more
- Failure to estimate terminal value implies incorrect valuation
- Cash flows for terminal value valuation must be normalized;
- Careful with the estimation of working capital requirements (WCR) and Capex in the cash flow of the perpetuity;
- Growth rate: Real growth + inflation for nominal cash flows
- Se g>inflation implies a continuing investment in capex and WCR

4. DCF Methods

i. Equity method

Equity method

$$V_E = \sum_{i=1}^{n} \frac{FCFE_i}{(1+k_e)^i} = \sum_{i=1}^{T} \frac{FCFE_i}{(1+k_e)^i} + \frac{TV_T}{(1+k_e)^T}$$

V_E – Equity Value
$FCFE_i$ – Free cash flow to Equity for year i
k_e – Cost of equity
TV_T – Terminal value in year T

ii. WACC method

WACC method

$$V_E = \sum_{i=1}^{T} \frac{FCFF_i}{(1+k_m)^i} + \frac{TV_T}{(1+k_m)^T} + VNOA - D_0$$

$FCFF_i$ – Free cash flow to the firm in year i to value the assets used by the firm's businesses
k_m - WACC
D_0 - Debt in year 0
TV_T – Terminal value in year T
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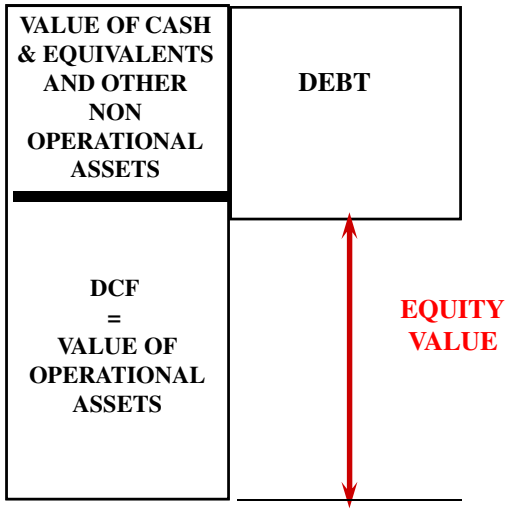
VNOA – Value of cash & equivalents and other non operational assets

WACC method



iii. APV – Adjusted Present Value

Adjusted Present Value

$$V_E = \sum_{i=1}^{T} \frac{FCFF_i}{(1+k_u)^i} + \frac{TV_T}{(1+k_u)^T} + VCD + VNOA - D_0$$

$FCFF_i$ – Free cash flow to the firm in year i
k_u – Unlevered cost of capital
TV_T – Terminal value in year T
VCD – Valued created by Debt
VNOA – Value of cash & equivalents and other non operational assets
D_0 – Debt at present

Value created by debt

GERAL FORMULA:

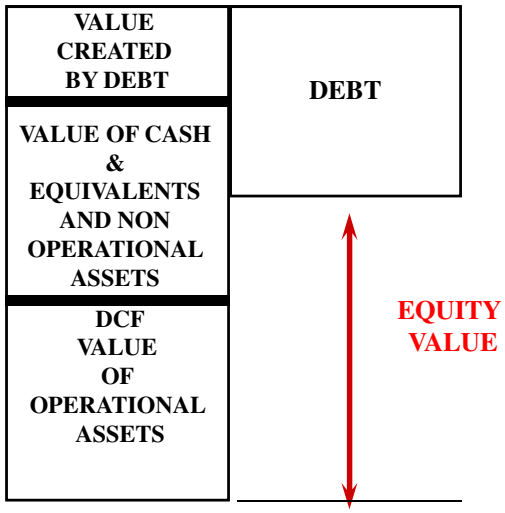
$$VCD = L_0 - \sum_{i=1}^{n} \frac{FE_i(1-t) + LR_i}{(1+r)^i}$$

IF k_d=r :

$$VCD = \sum_{i=1}^{n} \frac{FE_i \times t}{(1+r)^i} = \sum_{i=1}^{T} \frac{FE_i \times t}{(1+r)^i} + \frac{TVCD_T}{(1+r)^T}$$

VCD – value created by debt
FE_i – financial expenses in year i
t – tax rate
LR_i – loan Reimbursement in year i
r – market interest rate
k_d – company interest rate
$TVCD_T$= Terminal value created by debt at year T

APV method



5. More complex cases

More complex cases

- Large variance in the capital structure
- Continuing negative cash flows
- Assets that do not generate cash flows
- Bankruptcy risk
- High correlation with the economic cycle
- Existence of options

One example

See the example in the platform

Working Groups

Case study:

Valuation of a Company

Steps to conduct the valuation project:

1) Industry analysis and competitiveness
2) Financial statement analysis
3) Assumptions for future
4) Forecast of financial statements and cash flow
5) Apply a DCF model and estimate intrinsic value
6) Develop a sensitivity analysis
7) Use relative valuation
8) Conclusion