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

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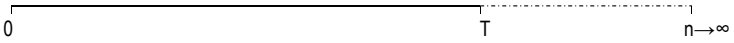
Intrinsic value or fundamental value

- 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

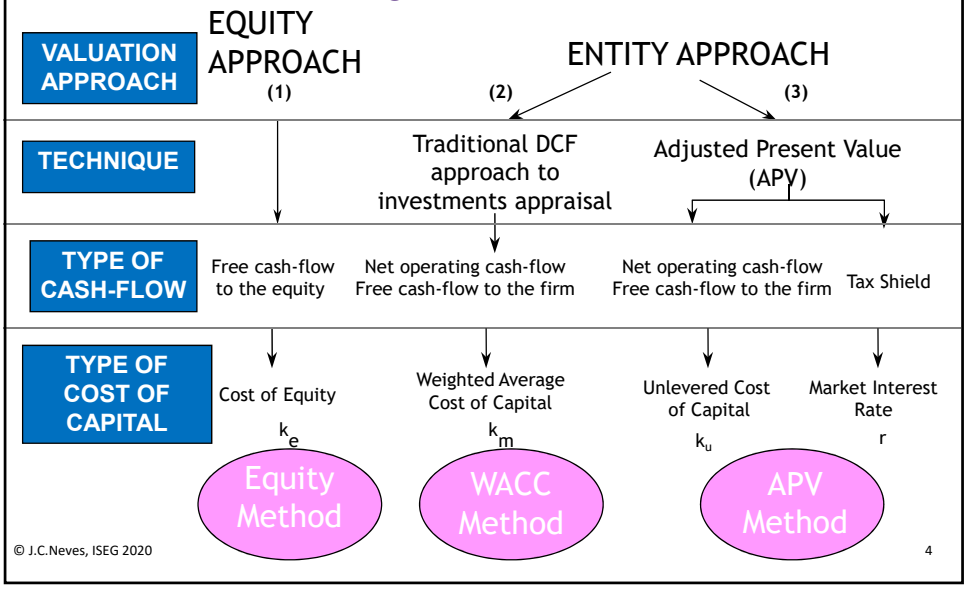
Discounted Cash Flow Valuation
General formula

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



V_0 – Present value of future cash flows (Intrinsic value)
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)
  - 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 preferred 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:

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

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 or 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

Net operating 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

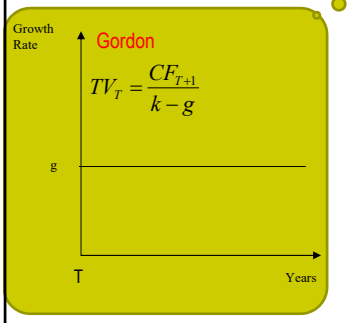
- Discounted cash flow models
  - No growth model
  - Constant growth model (Gordon)
  - Two phases of constant growth model (Malkiel)
  - Three phases of constant growth model (H of Fuller and Hsia)
- Relative valuation
- Cost approach

Terminal value: DCF Models

This is the most used in practice

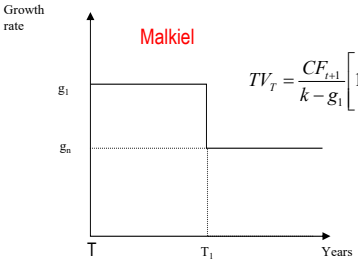
Gordon

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



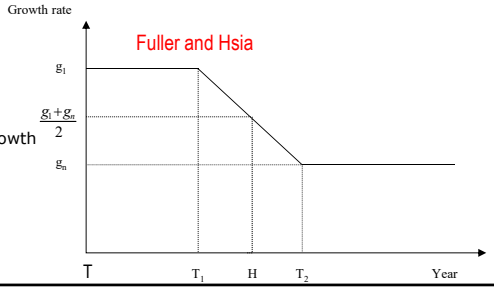
Malkiel

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



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

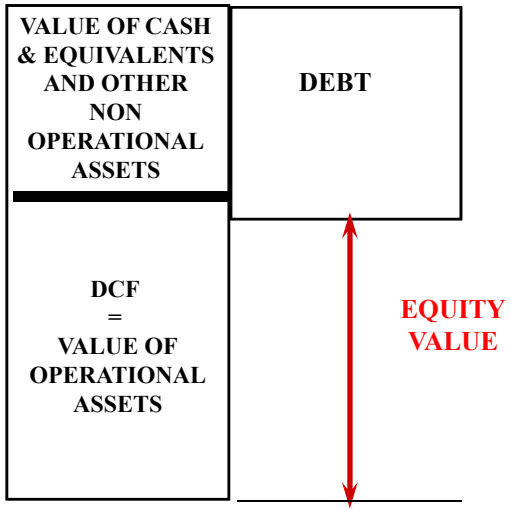
ii. WACC method

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
Cas
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:

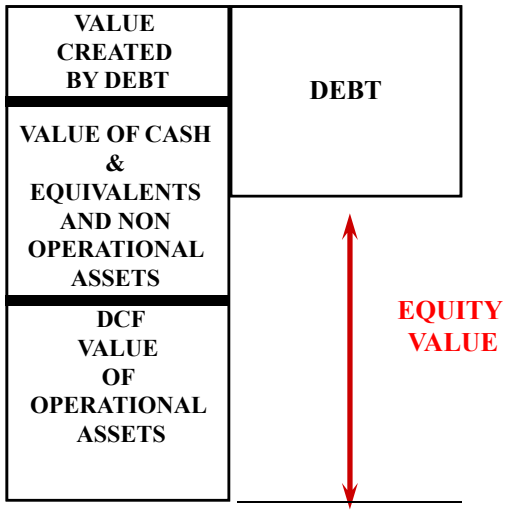
$$VCD = L_0 - \sum_{i=1}^{n} \frac{FE_i(1-t) + LR_i}{(1+r)^i}$$

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 the financial statements forecast and cost of capital
4) Financial statements forecasted (including the cash flow)
5) Apply of DCF model and estimate the intrinsic value
6) Develop risk analysis: sensitivity analysis, scenario analysis, Monte-Carlo simulation
7) Use relative valuation
8) Conclusion about the estimated value