



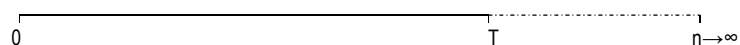
The three DCF models

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Discounted Cash Flow Valuation General formula

$$NPV_0 = -I_0 + \sum_{i=1}^n \frac{CF_i}{(1+k)^i} =$$

$$-I_0 + \sum_{i=1}^T \frac{CF_i}{(1+k)^i} + \frac{TV_T}{(1+k)^T}$$



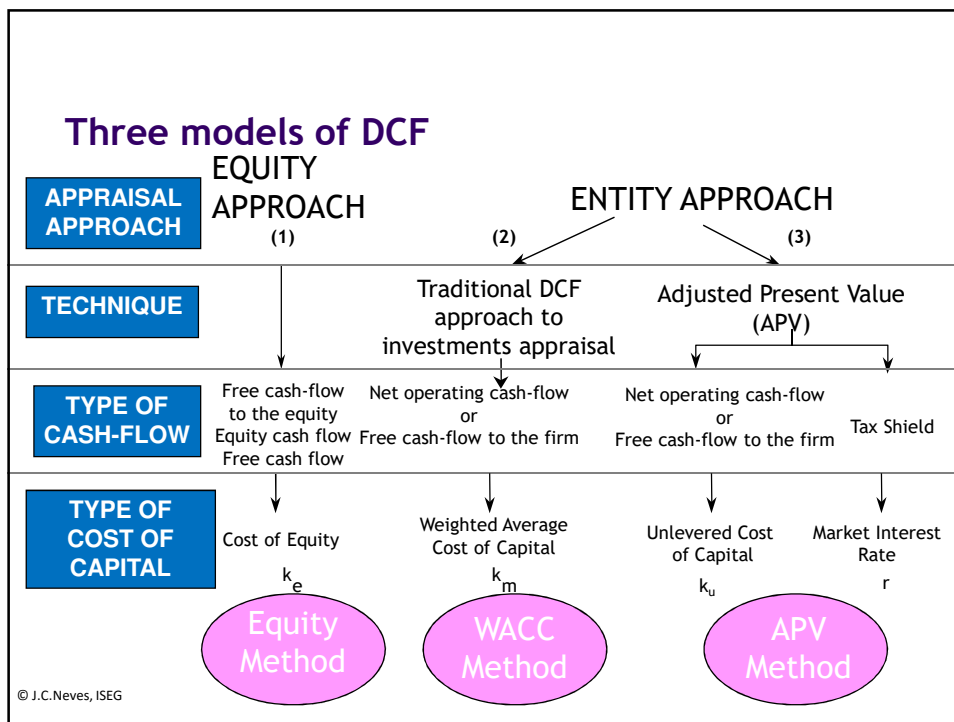
V_0 – Present value of future cash flows (Intrinsic value)

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



Agenda for learning DCF appraisal

- Cost of capital
 - Cost of equity
 - Cost of debt
 - Cost of preferred equity
 - Weighted average cost of capital (WACC)
 - Unlevered cost of capital
- Terminal value - Gordon model and Accounting
- DCF methods
 - The equity method
 - WACC method
 - APV method
- Types of cash flow
 - Free cash flow to the equity (Equity cash flow or Free cash flow)
 - Free cash flow to the firm (Net operational cash flow)

The CIA course has already addressed this issue

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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/(+) Divestments
- + New loans
- Reimbursement of capital loans

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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 (+) Divestments

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3. Estimate terminal value: Gordon model and accounting

Methods to estimate terminal value

- Discounted cash flow models
 - No growth model
 - Constant growth model (Gordon)
- Cost approach (Accounting)

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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

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4. DCF Methods

i. Equity method

Equity method

$$NPV_E = -I_0 + \sum_{i=1}^n \frac{FCFE_i}{(1+k_e)^i} = \sum_{i=1}^T \frac{FCFE_i}{(1+k_e)^i} + \frac{TV_T}{(1+k_e)^T}$$

NPV_E – NPV to the equity investor
 $FCFE_i$ – Free cash flow to equity for year i
 k_e – Cost of equity
 TV_T – Terminal value in year T

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ii. WACC method

WACC method

$$NPV_p = -I_0 + \sum_{i=1}^T \frac{FCFF_i}{(1+k_m)^i} + \frac{TV_T}{(1+k_m)^T}$$

NPV_p – NPV generated by the project

$FCFF_i$ – 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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iii. APV - Adjusted Present Value

Adjusted Present Value

$$NPV_P = -I_0 + \sum_{i=1}^T \frac{FCFF_i}{(1+k_u)^i} + \frac{TV_T}{(1+k_u)^T} + VCD$$

NPV_P – NPV generated by the project

$FCFF_i$ – Free cash flow to the firm in year i

k_u – Unlevered cost of capital

TV_T – Terminal value in year T

VCD – Value created by Debt i.e PV of tax shield

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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

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