

**FORMULAE \* Project Evaluation**  
English Class M01 2013/2014

<b>Working Capital</b>
<ul style="list-style-type: none"> <li>Working Capital= Raw materials in stock + Finished goods in stock + Monies owed by customers + Monies owned to suppliers<sup>1</sup> or</li> <li>Working Capital = Current Assets – Current Liabilities<sup>2</sup> or</li> <li>Working Capital = Accounts receivable + Inventory + Accounts payable<sup>3</sup></li> <li>Working Capital Investment= Working Capital<sub>t</sub> – Working Capital<sub>t-1</sub></li> </ul>
<b>Cash Flows for a Project</b>
CFG <sub>t</sub> = Global or Total Cash Flow in t
CFE <sub>t</sub> = Operational Cash Flow or Cash Flow from Operating Activities
<ul style="list-style-type: none"> <li>CFG<sub>t</sub> = Inflows<sub>t</sub> – Outflows<sub>t</sub></li> <li>CFG<sub>t</sub> = [-CI<sub>t</sub> + VR<sub>t</sub> - ΔNFM<sub>t</sub>] + CFE<sub>t</sub></li> </ul>
<p>CFG Global Cash Flow CI Cost of Investment VR Residual Value NFM Working Capital ΔNFM Investment in Working Capital</p>
<ul style="list-style-type: none"> <li>CFE<sub>t</sub> = RL<sub>t</sub> + A<sub>t</sub> + Aj<sub>t</sub> + EFFin<sub>t</sub></li> </ul>
<p>CFE Operational Cash Flow RL operating net return (net profit) A Depreciation Aj Adjustments EFFin<sub>t</sub> value of Interests paid (Interests)</p>
<ul style="list-style-type: none"> <li>FCF<sub>t</sub> = RAIEF<sub>t</sub> × (1-T) + A<sub>t</sub> + Aj<sub>t</sub> – Investment<sub>t</sub></li> <li>Free Cash Flow = Net Results before Taxes and Interest</li> </ul> <p>T= taxes (tax rate; e.g. 25%)</p>
<ul style="list-style-type: none"> <li>WACC definitions:</li> </ul>
<b>(Flow Global CF/Fluxo= CFG) WACC<sub>t</sub> = w<sub>d</sub> K<sub>d</sub> + (1 – w<sub>d</sub>) K<sub>s</sub><sub>t</sub></b>
<b>(Flow Free CF/Fluxo= FCF) WACC<sub>t</sub> = w<sub>d</sub> K<sub>d</sub> (1 – T) + (1 – w<sub>d</sub>) K<sub>s</sub><sub>t</sub></b>
<ul style="list-style-type: none"> <li>Cash Flow of Stockholders (=CFGA): CFGA<sub>t</sub> = CFG<sub>t</sub> + Received from funders(external capital)<sub>t</sub> – Paid to funders (external capital)<sub>t</sub></li> </ul>
<b>Financing Projects</b>
<ul style="list-style-type: none"> <li>WACC = w<sub>s</sub> k<sub>s</sub> + w<sub>d</sub> k<sub>d</sub></li> <li>APV=NPV of the project if financed 100% by own capital + discounted value of fiscal saving from interest payment</li> <li>ks<sub>i</sub> = R<sub>F</sub> + risk premium</li> <li>Risk Premium<sub>i</sub> = (R<sub>M</sub> – R<sub>F</sub>) β<sub>i</sub></li> </ul>

<sup>1</sup> Crundwell (2008, p.7)

<sup>2</sup> Crundwell (2008, p.113)

<sup>3</sup> Crundwell (2008, p.113)

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- $$\beta_i = \frac{\text{Cov}(R_i, RM)}{\sigma_M^2}$$

- **NPV of a project (assuming a constant k):**

$$\text{NPV} = \sum_{t=0}^n \frac{CFG_t}{(1+k)^t}$$

- **IRR**

$$\sum_{t=1}^n \frac{CFE_t}{(1+TIR)^t} = CI_0$$

<ul style="list-style-type: none"> <li>• <b>IRR Modified or Modified Internal Rate of Return (MIRR)<sup>4</sup></b></li> </ul> $\frac{\sum_{t=1}^n CFE_t (1 + R_2)^{n-t}}{(1 + TIRM)^n} = CI_0$	
<ul style="list-style-type: none"> <li>• <b>Profitability Index</b></li> </ul> $PI = \left[ \frac{\sum_{t=1}^n \frac{CFE_t}{(1 + k)^t}}{CI_0} \right]$	
<ul style="list-style-type: none"> <li>• <b>Adjusted Present Value, APV</b></li> </ul> $APV = \sum_{t=0}^n \frac{FCF_t}{(1 + k_{S_U})^t} + \sum_{t=1}^n \frac{kdD_t T}{(1 + kd)^t}$	
<b>Decisions under uncertainty</b>	
<ul style="list-style-type: none"> <li>• <b>NPV ( using certainty equivalent method)</b></li> </ul> $NPV = \sum_{t=0}^n \frac{\alpha_t CFG_t}{(1 + R_f)^t}$	

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<sup>4</sup> Crundwell (2008), p.180.