

Corporate finance - Valuation of projects

Homework 07 - Solution

WACC:

$$wacc = 0.3 * 0.075 + 0.7 * 0.06 * (1 - 0.15) = 0.0582$$

NPV:

Project A:

$$NPV = \sum_{i=1}^5 \frac{CF_i}{(1 + wacc)^i} = 735.05$$

Note: $CF_4 = 41000 - 30000 = 11000$

Project B:

| year | 0 | 1 | 2 | 3 |
|--------|---------|--------|--------|--------|
| CF_- | -10,000 | -2,000 | -2,000 | -2,000 |
| CF_+ | | 3,600 | 5,300 | 8,600 |

Note: CF_+ : **1.** $0.3 * 2000 + 0.5 * 4000 + 0.2 * 5000$ | **2.** $0.3 * 3000 + 0.5 * 6000 + 0.2 * 7000$ | **3.** $0.3 * 7000 + 0.5 * 9000 + 0.2 * 10000$

$$NPV = \sum_{i=1}^3 \frac{CF_i}{(1 + wacc)^i} = 28.80$$

Payback period:

| year | 0 | 1 | 2 | 3 | 4 |
|------------|---------|---------|-----------|-----------|--------|
| $cum.dCFA$ | -90,000 | -80,550 | -65,368.5 | -27,903.1 | 735.05 |
| $cum.dCFB$ | -10,000 | -8,488 | -5,541.01 | 28.80 | |

Project A: $\approx 4\text{years} + 10\text{days}$.

Project B: $\approx 2\text{years} + 2\text{days}$.

IRR:

Project A:

Note: $r_1 = wacc, r_2 = 0.065, \rightarrow NPV = -1189.23$

$$IRR_A = r_1 + \frac{NPV_1}{NPV_1 + NPV_2} * (r_2 - r_1) = 0.0608$$

Project B:

Note: NPV was already small, if $r_2 = 0.059 \rightarrow NPV = -1254.69$

$$IRR_B = \dots = 0.058218$$

MIRR:

Project A:

| year | 0 | 1 | 2 | 3 | 4 | 5 |
|-----------------------|---------|-----------|----------|-----------|----------|--------|
| PV of CF ₋ | -90,000 | | | -23,924.9 | | |
| FV of CF ₊ | | 12,539.23 | 20,144.3 | 38,072.77 | 43,386.2 | 38,000 |

$$MIRR = \sqrt[5]{\frac{152142.5}{113925}} - 1 = 0.05956$$

Project B:

| year | 0 | 1 | 2 | 3 |
|-----------------------|---------|----------|-----------|-----------|
| PV of CF ₋ | -10,000 | -1,890 | -1,786.05 | -1,687.82 |
| FV of CF ₊ | | 4,031.23 | 5,608.46 | 8,600 |

$$MIRR = \sqrt[3]{\frac{18239.69}{15363.9}} - 1 = 0.0589$$

Note: For discounting & capitalization is used wacc.