**Investment effectiveness - example**

**Solved example:**

The project´s investment cost (K) is 400 thousand CZK. Expected cash flow from investment: first year 120 thousand CZK, second year 150 thousand CZK, third year 160 thousand CZK, fourth year 130 thousand CZK (from that profit after taxes: first year 20 thousand CZK, second year 50 thousand CZK, third year 60 thousand CZK, fourth year 30 thousand CZK). The expected life of the investment is 4 years. The company's discount rate is 12 %.

Assignment:

* Calculate:

1. Return on Investment,
2. Payback Period
3. Nominal payback period,
4. Discounted payback period,
5. Net Present Value,
6. Internal Rate of Return.

* Conduct the final assessment of this investment project.

Solution:

1. Return on Investment:

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Return on Investment (10 %) is lower than required return (12 %), the project should be rejected based on this method.

1. Payback Period:
2. Nominal payback period:

|  |  |  |
| --- | --- | --- |
| Year | Expected cash flow | |
|  | annual | cumulative |
| 1 | 120 | 120 |
| 2 | 150 | 270 |
| 3 | 160 | 430 |
| 4 | 130 | 560 |



As the payback period is 2,81 years and as it is shorter than the expected life of the investment (4 years), the project should be accepted based on this method.

1. Discounted payback period:

|  |  |  |
| --- | --- | --- |
| Year | Expected discounted cash flow | |
|  | annual | cumulative |
| 1 |  | 107,1 |
| 2 |  | 226,7 |
| 3 |  | 340,6 |
| 4 |  | 423,2 |



The investment will be repaid during its expected life, but the length of the time of repayment is markedly close to the life of the investment; even so, this project should be accepted based on this method.

1. Net Present Value:



If NPV is positive (*NPV* = 23 200 CZK), the project should be accepted based on this method.

1. Internal Rate of Return:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Expected discounted net cash flow | | | |
|  | Discounted rate (i) 14 % | | Discounted rate (i) 15 % | |
|  | annual | cumulative | annual | cumulative |
| 0 | - 400,0 | - 400,0 | - 400,0 | - 400,0 |
| 1 | 105,3 | - 294,7 | 104,3 | - 295,7 |
| 2 | 115,4 | - 179,3 | 113,4 | - 182,3 |
| 3 | 108,0 | - 71,3 | 105,2 | - 77,1 |
| 4 | 77,0 | 5,7 | 74,3 | - 2,8 |



IRR (14,67 %) is higher than required return (12 %), the project should be accepted

based on this method.

Final assessment of the investment project:

Based on both the static methods (Nominal Payback Period, but with the exception of the Return on Investment reference indicator), and the dynamic methods (Discounted Payback Period, Net Present Value, Internal Rate of Return), this investment project appears to be favourable. The difference in evaluation of the nominal and the discounted payback period is due to the dynamic method’s accounting for the time factor, in which case the assessment is stricter, but also more accurate. The longer expected life of the investment (4 years) and the higher discount rate (12 %) are both reasons for us to prefer the dynamic methods of evaluation in this case, and to recommend the project.

**Example to practice**

**Example 1:**

The company is considering buying a universal machine tool with the following specifications:

* the purchase price is 5 200 000 CZK,
* the expected service life is 5 years, linear depreciation is assumed,
* the investment is to be funded by a loan amounting to 2 600 000 CZK with a 10 % interest rate, the remaining amount is to be covered by own sources,
* the rate of taxation of profits (income tax rate) is 19 %,
* the company’s discount rate is assumed to be at the level of average amount of capital costs, while the required return on equity (the dividend rate) is 15,9 %,
* the expected net profit from this investment in the individual years of its life is:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| year | 1 | 2 | 3 | 4 | 5 |
| Profit after taxes | 300 000 | 350 000 | 400 000 | 450 000 | 500 000 |

Assignment:

1. Perform calculations using the following methods of investment evaluation:

* Return on Investment,
* Nominal and Discounted payback period,
* Net Present Value
* Internal Rate of Return.

1. Assess, whether the investment into the universal machine tool is favorable.

Solution:

1. Calculations using the individual methods of evaluation of investment effectiveness:

Calculations of the necessary parameters:

* Expected cash flow:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* The Risk-Adjusted Discount Rate = Weighted Average Cost of Capital:

Calculations using the methods of investment evaluation:

**Return on Investment:**

**Payback Period:**

**Nominal Payback period:**

|  |  |  |
| --- | --- | --- |
| Year | Expected income | |
|  | annual | cumulative |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

**Discounted Payback period:**

|  |  |  |
| --- | --- | --- |
| Year | Expected discounted cash flow | |
|  | annual | cumulative |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

**Net Present Value:**

**Internal Rate of Return:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Expected discounted net cash flow | | | |
|  | Discounted rate (i) % | | Discounted rate (i) % | |
|  | annual | cumulative | annual | cumulative |
| 0 |  |  |  |  |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |