Profitability Index

Profitability index is calculated as:

$$\text{PI} = \frac{\text{NPV(future cash flows excluding the initial investment)}}{\text{Initial investment at time zero}}$$

Projects are accepted if their profitability index is more than one. The bigger the profitability index the better.

The profitability index is simple to understand, but since it's a proportional measure, not a dollar value measure, it suffers from the same scale effect problem as the internal rate of return (IRR) method.

Calculation Example: Profitability Index

Question: A mining firm's potential new gold mine has the following after-tax cash flows:

- \$9m outflow to buy extra machinery needed to excavate the mine which will be delivered and paid for immediately (t=0).
- \$6m inflow in one year (t=1) from gold sales.
- \$5m inflow in two years (t=2) from gold sales.

The discount rate is 10% pa given as an effective annual rate.

What is the profitability index?

Answer: Remember that an investment is a cash outflow, just the same as a cost. So a positive investment is a negative cash flow:

$$Initial\ investment = -(C_0) = -(-9m) = \$9m$$

NPV(future cash flows excluding the initial investment)

$$= \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2}$$

$$= \frac{6m}{(1+0.1)^1} + \frac{5m}{(1+0.1)^2}$$

$$= \$9.58677686m$$

$$\mathrm{PI} = \frac{\text{NPV(future cash flows excluding the initial investment)}}{\text{Initial investment at time zero}}$$

$$= \frac{\$9.58677686m}{\$9m} = 1.065197429$$

Since the profitability index is more than one, the project should be accepted.

Questions: Profitability index

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