

## Discounted Cash Flow Applications

1. Given the following cash flows for a capital project, calculate the NPV and IRR. The required rate of return is 8%.

Year	0	1	2	3	4	5
Cash flow	-50,000	15,000	15,000	20,000	10,000	5,000

2. Given the following cash flows for a capital project, calculate its payback period and discounted payback period. The required rate of return is 8%. The discounted payback period is:

Year	0	1	2	3	4	5
Cash flow	-50,000	15,000	15,000	20,000	10,000	5,000

4. An investment of \$150,000 is expected to generate an after-tax cash flow of \$100,000 in one year and another \$120,000 in two years. The cost of capital is 10%. What is the internal rate of return?
6. Kim Corporation is considering an investment of 750 million won with expected after-tax cash inflows of 175 million won per year for seven years. The required rate of return is 10%. Expressed in years, the project's payback period and discounted payback period, respectively, are *closest* to:
7. An investment of \$20,000 will create a perpetual after-tax cash flow of \$2,000. The required rate of return is 8%. What is the investment's profitability index?
12. Projects 1 and 2 have similar outlays, although the patterns of future cash flows are different. The cash flows as well as the NPV and IRR for the two projects are shown in the following table. For both projects, the required rate of return is 10%.

Year	Cash Flows					NPV	IRR
	0	1	2	3	4		
Project 1	-50	20	20	20	20	13.40	21.86%
Project 2	-50	0	0	0	100	18.30	18.92%

The two projects are mutually exclusive. What is the appropriate investment decision?

- A. Invest in both projects.
- B. Invest in Project 1 because it has the higher IRR.
- C. Invest in Project 2 because it has the higher NPV.

3. Bestfoods, Inc. is planning to spend \$10 million on advertising. The company expects this expenditure to result in annual incremental cash flows of \$1.6 million in perpetuity. The corporate opportunity cost of capital for this type of project is 12.5 percent.

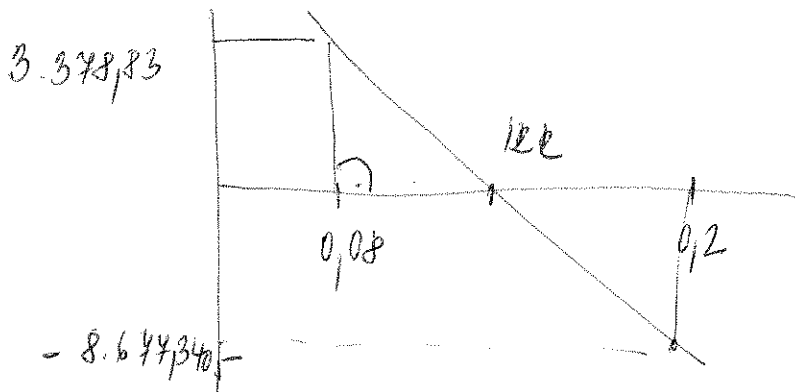
- A. Calculate the NPV for the planned advertising.
- B. Calculate the internal rate of return.
- C. Should the company go forward with the planned advertising? Explain.

5. Westcott-Smith is a privately held investment management company. Two other investment counseling companies, which want to be acquired, have contacted Westcott-Smith about purchasing their business. Company A's price is £2 million. Company B's price is £3 million. After analysis, Westcott-Smith estimates that Company A's profitability is consistent with a perpetuity of £300,000 a year. Company B's prospects are consistent with a perpetuity of £435,000 a year. Westcott-Smith has a budget that limits acquisitions to a maximum purchase cost of £4 million. Its opportunity cost of capital relative to undertaking either project is 12 percent.

- A. Determine which company or companies (if any) Westcott-Smith should purchase according to the NPV rule.
- B. Determine which company or companies (if any) Westcott-Smith should purchase according to the IRR rule.
- C. State which company or companies (if any) Westcott-Smith should purchase. Justify your answer.

$$NPV = \frac{-50.000}{(1+0,08)^0} + \frac{15.000}{(1,08)^1} + \frac{15.000}{1,08^2} + \frac{20.000}{1,08^3} + \frac{10000}{1,08^4} + \frac{5000}{1,08^5}$$

$$NPV = 3.348,83$$



$$\frac{3.348,83}{IRR - 0,08} = \frac{8.644,3405}{0,2 - IRR}$$

$$645,466 - 3.348,83 IRR = 8.644,3405 IRR - 694,1872$$

$$- 12.056,1405 IRR = - 1.369,9532$$

$$IRR = 0,1136 \Rightarrow 11,36\%$$

	0	1	2	3	4	5
	-50000	15.000	15.000	20.000	10.000	5.000
FV	-50.000	13.888,89	12.860,08	15.846,64	7.350,20	3.402,92

$$PB = 3$$

$$PB = 4 \text{ YEARS} + 0,01 = 4,01 \text{ YEARS}$$

4

$$-150.000 + \frac{100.000}{1+iR} + \frac{120.000}{(1+iR)^2} = 0$$

$$1+iR = A$$

$$-150.000 + \frac{100.000}{A} + \frac{120.000}{A^2} = 0$$

$$-150.000 A^2 + 100.000 A + 120.000 = 0$$

$$-150 A^2 + 100 A + 120 = 0$$

$$-45 A^2 + 50 A + 60 = 0$$

$$-15 A^2 + 10 A + 12 = 0$$

$$A_{1/2} = \frac{-10 \pm \sqrt{100 + 420}}{-30} = \frac{-10 \pm 28,6356}{-30} = 1,2879$$

$$\rightarrow iR = 0,2879 \rightarrow \underline{28,79\%}$$

6

	1	2	3	4	5	6	7
-450	145	145	145	145	145	145	145
	-545	-400	-225	-50	+125		
PV	159,091	144,6281	131,4800	119,5274	109,6612	98,4829	89,8026

$$PB = 4 + 0,2857 = 4,3$$

$\rightarrow$  4 YEAR + 3,4 MONTH

$\rightarrow$  5 YEAR + 10,52 MONTH

$$PB = 5 + 0,8468 = 5,9$$

7

$$PI = \frac{\frac{2000}{0,08}}{20.000} = \frac{2500}{20.000} = 1,25 \rightarrow \boxed{25\%}$$

12

$r = 10\% \rightarrow C$

AR = X

14

$$-50 + \frac{100}{A} - \frac{50}{A^3} = 0$$

$$-50A^3 + 100A^2 - 50 = 0$$

$$-50A^3 + 100A^2 = 50$$

$$A^2 \cdot (-50A + 100) = 50$$

$$A^2 = 50 \rightarrow \pm \sqrt{25}$$

$$-50A + 100 = 50$$

3

$$PV = \frac{1.600.000}{0,125} - 12.800.000$$

A

$$NPV = \underline{2.800.000}$$

$$IRR \Rightarrow -10.000.000 + \frac{1.600.000}{IRR} = 0$$

3

$$-10.000.000 \cdot IRR = -1.600.000$$

$$IRR = 0,16 \rightarrow \underline{16\%}$$

5

$$P_{0A} = 2.000.000 \rightarrow CF = 300.000$$

$$P_{13} = 3.000.000 \rightarrow CF = 435.000$$

$$NPV = -2.000.000 + \frac{300.000}{0,12} = \boxed{500.000}$$

$$-3.000.000 + \frac{435.000}{0,12} = \boxed{625.000}$$

NPV ONLY

$$A) -2000.000 + \frac{300.000}{IRR} = 0$$

$$IRR = 0,15$$

✓

$$B) -3000.000 + \frac{435.000}{IRR} = 0$$

$$IRR = 0,145$$

IRR

RULE