

Investition und Finanzierung

Tutorium Nr. 6

Bei Fragen, Anmerkungen oder Kritik:
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Aufgabe 40 (6 A17)

CALCULATING PROFITABILITY INDEX

Suppose the following two independent investment opportunities are available to Greenplain Ltd. The appropriate discount rate is 10 per cent.

Year	Project Alpha (€)	Project Beta (€)
0	-500	-2.000
1	300	300
2	700	1.800
3	600	1.700

a) Compare the two projects.

b) Which project(s) should Greenplain accept, based on the profitability index rule?

Aufgabe 41 (6A24)

Comparing Investment Criteria

The treasurer of Amaro Canned Fruits has projected the cash flows of projects A, B and C as follows:

Year	Project A (€)	Project B (€)	Project C (€)
0	-100.000	-200.000	-100.000
1	70.000	130.000	75.000
2	70.000	130.000	60.000

Suppose the relevant discount rate is 12 per cent per year.

Aufgabe 41 (6A24)

- a) Compute the profitability index for each of the three projects.
- b) Compute the NPV for each of the three projects.
- c) Suppose these three projects are independent. Which project(s) should Amaro accept, based on the profitability index rule?
- d) Suppose these projects are mutually exclusive. Which project(s) should Amaro accept, based on the profitability index rule?
- e) Suppose Amaro's budget for these projects is €300.000. The projects are not dividable. Which project(s) should Amaro accept?

Lösung zu Aufgabe 41 (6A24)

c) Accept projects A, B, and C. Since the projects are independent, accept all three projects because the respective profitability index of each is greater than one.

d) Accept Project B. Since the Projects are mutually exclusive, choose the Project with the highest PI, while taking into account the scale of the Project. Because Projects A and C have the same initial investment, the problem of scale does not arise when comparing the profitability indices. Based on the profitability index rule, Project C can be eliminated because its PI is less than the PI of Project A. Because of the problem of scale, we cannot compare the PIs of Projects A and B. However, we can calculate the PI of the incremental cash flows of the two projects, which are:

Project	C0	C1	C2
B-A	-€100,000	€60,000	€60,000

Lösung zu Aufgabe 41 (6A24)

d) When calculating incremental cash flows, remember to subtract the cash flows of the project with the smaller initial cash outflow from those of the project with the larger initial cash outflow. This procedure insures that the incremental initial cash outflow will be negative. The incremental PI calculation is:

$$\begin{aligned} \text{PI}(B - A) &= [\text{€}60,000 / 1.12 + \text{€}60,000 / 1.122] / \text{€}100,000 \\ \text{PI}(B - A) &= \underline{\underline{1.014}} \end{aligned}$$

The company should accept Project B since the PI of the incremental cash flows is greater than one.

Aufgabe 42 (7A2)

Incremental Cash Flows

In the context of capital budgeting, what is an opportunity cost?

Inflation and Capital Budgeting

In an hyperinflationary environment, how would you incorporate inflation into a capital budgeting analysis? Explain your methodology in words to a manager who is worried about the power of capital budgeting when inflation is very high.

Aufgabe 45 (7A17)

Inflation and company value

Sparkling Water Plc expects to sell 2 Million bottles of drinking water each year in perpetuity. This year each bottle will sell for £1.25 in real terms and will cost £0.70 in real terms. Sales income and costs occur at year-end. Revenues will rise at a real rate of 7 per cent annually, while real costs will rise at a real rate of 5 per cent annually. The real discount rate is 10 per cent. The corporate tax rate is 28 per cent. What is Sparkling worth today?

Lösung zu Aufgabe 45 (7A17)

To determine the value of a firm, we can simply find the present value of the firm's future cash flows. No depreciation is given, so we can assume depreciation is zero. Using the tax shield approach, we can find the present value of the aftertax revenues, and the present value of the aftertax costs. The required return, growth rates, price, and costs are all given in real terms. Subtracting the costs from the revenues will give us the value of the firm's cash flows. We must calculate the present value of each separately since each is growing at a different rate. First, we will find the present value of the revenues. The revenues in year 1 will be the number of bottles sold, times the price per bottle, or:

Aufgabe 44 (7A19)

Equivalent Annual Cost

Bridgton Golf Academy is evaluating different golf equipment. The “Dimple-Max” equipment costs £45,000, has a three-year life and costs £5,000 per year to operate. The relevant discount rate is 12 per cent. Assume that the reducing balance (20 per cent) depreciation method is used. Furthermore, assume the equipment has a salvage value of £20,000 at the end of the project’s life. The relevant tax rate is 28 per cent. All cash flows occur at the end of the year.

What is the equivalent annual cost (EAC) of this equipment?

Lösung zu Aufgabe 44 (7A19)

To calculate the EAC of an investment, first calculate the depreciation schedule.

Year		1	2	3
a) Starting Value		£45,000	£36,000	£28,800
b) Depreciation	20% (a)	£9,000	£7,200	£8,800
c) Accumulated Depreciation		£9,000	£16,200	£25,000
d) Residual Value	a) - c)	£36,000	£28,800	£20,000

Lösung zu Aufgabe 44 (6A19)

Now use the depreciation schedule to estimate the operating cash flow.

	1	2	3
Pre-Tax Operating Costs	-£ 5,000	-£ 5,000	-£ 5,000
Depreciation	-£ 9,000	-£ 7,200	-£ 8,800
= EBT	-£ 14,000	-£ 12,200	-£ 13,800
Tax (28%)	-£ 3,920	-£ 3,416	-£ 3,864
Net Income	-£ 10,080	-£ 8,784	-£ 9,936

	1	2	3
Net Income	-£ 10,080	-£ 8,784	-£ 9,936
Depreciation	£9,000	£7,200	£8,800
Operating Cash Flow	-£ 1,080	-£ 1,584	-£ 1,136

Lösung zu Aufgabe 44 (7A19)

The cash flows for each year are now calculated.

	0	1	2	3
Investment	-£ 45,000			£ 20,000
Operating Cash Flow		-£1,080	-£ 1,584	-£ 1,136
Cash Flows	-£ 45,000	-£1,080	-£ 1,584	£ 18,864
PV Cash Flow	-£45,000	-£ 964	-£ 1,236	£ 13,427

The Net Present Value is -£33,800 and the Equivalent Annual Cost is

$$-£33,800 = EAC(PVIFA12\%,3)$$

$$EAC = \underline{\underline{£14,072}}$$