

1. Suppose you are a Dutch investor, who wants a safe investment in terms of Guilders. You are investing for one year and the interest rate on a one-year Netherlands government bond is 6% and at the same time it is 9% on a U.S. government bond. The exchange rate is currently 2.05 Guilders to the dollar. Suppose you invest \$1,000 in a U.S. bond. Also suppose a year from now that the Guilder/dollar exchange rate is 2.15 Guilders to the dollar.

(a) What will be the realized Dutch rate of return on the U.S. bond?

(b) What does the exchange rate have to be at year's end for the Dutch investor to earn exactly 12% per year on the investment in U.S. bonds?

Answer:

$$\begin{aligned} \text{(a) Dutch realized rate of return} &= \frac{\$1090 \times \text{Future Guilder price of dollar} - 2050}{2050} \\ &= \frac{\$1090 \times 2.15 - 2050}{2050} \\ &= 14.32\% \end{aligned}$$

$$\begin{aligned} \text{(b) Dutch rate of return} &= \frac{\$1090 \times \text{Future Guilder price of dollar} - 2050}{2050} \\ 0.12 &= \frac{\$1090 \times \text{Guilder price} - 2050}{2050} \end{aligned}$$

Future price of Guilder = 2.11 Guilder per dollar

2. You invest in a stock that costs \$42.50 per share. It pays a cash dividend during the year of \$1.80 and you expect its price to be \$45 at year's end. What is your realized rate of return if the stock's price is actually \$39 at year's end?

Answer: *Realized rate of return = $\frac{\text{Ending Price} - \text{Beginning Price} + \text{Cash Dividend}}{\text{Beginning Price}}$*

$$\begin{aligned} &= \frac{\$39 - \$42.50 + \$1.80}{\$42.50} \\ &= -4\% \end{aligned}$$

3. Suppose the risk-free nominal interest rate on a one-year U.S. Treasury bill is 5% per year and the expected rate of inflation is 3%. What is the expected real rate of return on the T-bill?

Answer: *Real rate = $\frac{\text{Nominal interest rate} - \text{Rate of Inflation}}{1 + \text{Rate of inflation}}$*

$$= \frac{0.05 - 0.03}{1 + 0.03}$$

$$\begin{aligned}
 & 1 + 0.03 \\
 &= \frac{0.02}{1.03} \\
 &= 1.94\%
 \end{aligned}$$

4. CyberNow is opening an office in the U.S. CyberNow expects cash flows to be \$500,000 for the first year, \$530,000 for the second year, \$560,000 in the third year. If CyberNow uses 12 percent as its discount rate, what is the present value of the cash flows? Assume cash flows are made at the end of the year.

Answer:

$$\begin{aligned}
 PV &= \sum_{n=1}^3 FV/(1 + i)^n \\
 &= 500,000/(1.12)^1 + 530,000/(1.12)^2 + 560,000/(1.12)^3 \\
 &= \$446,429 + \$422,513 + \$398,597 \\
 &= \$1,267,539
 \end{aligned}$$

5. Let us suppose you have a choice between investing in a bank savings account that pays 9% compounded annually (Bank Yearly) and one that pays 8.5% compounded daily (Bank Daily). (Assume this is based on 365 days). Using only effective annual rates, which bank would you prefer?

Answer:

$$\begin{aligned}
 \text{Effective annual rate: Bank Yearly} &= 9\% \\
 \text{Effective annual rate: Bank Daily} &= [1 + 0.085/365]^{365} - 1 \\
 &= 8.87\%
 \end{aligned}$$

You would prefer Bank Yearly because you will earn more money.

6. You have the chance to buy a bond for \$900 that will make one payment of \$1,100 six years from today. What is the internal rate of return in the bond's cash flows?

Answer:

$$\begin{aligned}
 900(1 + i)^6 &= 1,100 \\
 (1 + i)^6 &= 1.222 \\
 i &= (1.222)^{1/6} - 1 \\
 i &= 3.40\%
 \end{aligned}$$

7. Consider the situation where you are trying to decide if you should invest in an Australian project or an American project. Both projects require an initial outlay of \$20,000. The Australian project will pay you Aust \$40,000 per year for 6 years, whereas the American one will generate \$25,000 per year for 6 years. The Australian dollar interest rate is 6% per year and the American interest rate is 5% per year; the current dollar price of an Australian dollar is \$0.65 per Australian dollar. Which project do you choose?

Answer:

American Project:

<i>n</i>	<i>i</i>	<i>PV</i>	<i>FV</i>	<i>PMT</i>	<i>PV Result</i>
6	5	?	0	\$25,000	\$126,892

Australian Project:

<i>n</i>	<i>i</i>	<i>PV</i>	<i>FV</i>	<i>PMT</i>	<i>PV Result</i>
6	6	?	0	\$40,000	\$196,693 (Aust)

$$NPV_{US} \text{ project} = \$126,892 - \$20,000 = \$106,892$$

Today the Australian project is worth A\$196,693 x \$0.65 per Aust
= \$127,850.45 (in U.S. dollars)

$$NPV_{Aust} \text{ project} = \$127,850.45 - \$20,000 = \$107,850.45$$

Choose the Australian project since it has a higher NPV.

8. The real rate of interest is 3.756%, the nominal rate of interest is 10.5% and the rate of inflation is 6.5%. What is the real future value of \$2,000 in 40 years?

Answer:

Method One:

$$\begin{aligned} \text{Real future value} &= \$2,000 \times 1.03756^{40} \\ &= \$8,741 \end{aligned}$$

Method Two:

$$\begin{aligned} \text{Nominal future value} &= \$2,000 \times 1.105^{40} \\ &= \$108,522.83 \\ \text{Future price level} &= 1.065^{40} \\ &= 12.16 \end{aligned}$$

$$\begin{aligned} \text{Real FV} &= \frac{\text{nominal future value}}{\text{future price level}} \\ &= \frac{\$108,522.83}{12.16} \\ &= \$8,741 \end{aligned}$$

9. You are evaluating two independent projects for Licorice Corporation, with the following net cash flows:

<u>Year</u>	<u>Project A</u>	<u>Project B</u>
0	-\$100,000	-\$100,000

1	55,000	35,000
2	45,000	38,000
3	40,000	41,000
4	35,000	42,000
5	0	45,000

If Licorice Corp's cost of capital is 9%, which project(s) should be accepted? What if the two projects are mutually exclusive

Answer:

Net Present Value (Project A) = \$44,016.54

Net Present Value (Project B) = \$54,754.23

Note that these are independent projects; accepting one does not preclude accepting the other. Since both projects have positive NPVs, both should be accepted. If the two projects are mutually exclusive, choose Project B.

10. Consider the following mutually exclusive projects, for a firm using a discount rate of 10%:

Project	Initial Investment	NPV	IRR
A	\$1,000,000	\$100,000	10.2%
B	\$100	\$1	11%
C	\$50,000	\$70,000	23%
D	\$200,000	\$24,000	13%

Which project should the firm accept? Please explain.

Answer: *Note the scaling differences associated with these projects, and the conflicting NPV and IRR results. In such cases, the project with the highest NPV should be chosen. Therefore the firm should accept Project A.*

11. A new type of beverage is being considered by Chateau Ultimo. This project is completely independent of all the other projects at Chateau Ultimo. An outlay of \$4.2 million is required for equipment to produce the new product, and additional net working capital in the amount of \$3 million is also required. The firm will recover all working capital at the end of the project. The project will be terminated in six years and the equipment will be fully depreciated over six years using the straight-line method. Revenues are expected to be \$8 million per year during the project, while operating expenses (excluding depreciation) for the project are expected to be \$5 million per year. There will be an additional \$1 million working capital requirement during the first year, and no working capital additions beyond that time. The required rate of return for this project is 11% and the relevant tax rate is 40%. Calculate the NPV of this project.

Answer:

Calculate net initial outlay = equipment + Δ NWC
= \$4.2 million + \$3 million

$$= \$7.5 \text{ million}$$

Next, calculate depreciation = 4.2 million/6

$$= \$0.7 \text{ million}$$

Cash flow year 1 = Net income + Noncash Expenses – Additional NWC

$$= 0.6(8 - 5 - 0.7) + 0.7 - 1$$

$$= \$1.14 \text{ million}$$

Annual net cash flow for years 2-5 = Net income + Noncash Expenses

$$= 0.6(8 - 5 - 0.7) + 0.7$$

$$= \$2.08 \text{ million}$$

Cash flow in Year 6 = Net income + Noncash Expenses + Recovery of NWC

$$= \$2.08 \text{ million} + \$4 \text{ million}$$

$$= \$6.08 \text{ million}$$

Now calculate NPV @ 11% cost of capital:

$$NPV = \$2,837,181.18$$

12. A new type of T-shirt is being considered by ActiveWear Textiles Corp. This project is completely independent of all the other projects at ActiveWear. An outlay of \$15 million is required for equipment to produce the new product and additional net working capital in the amount of \$3.2 million is also required. The firm will recover the \$3.2 million in working capital at the end of the project. The project will be terminated in six years and the equipment will be fully depreciated over six years using the straight-line method. Revenues minus operating expenses for the project are expected to be \$5 million per year. There will be no working capital requirements during the project (except for the \$3.2 million at the beginning). The required rate of return on this project is 16% and the tax rate is 35%. Determine whether this project should be accepted by computing its NPV.

Answer:

Net initial investment = \$15,000,000 + \$3,200,000

$$= \$18,200,000$$

Annual depreciation = \$15 million/6

$$= \$2.5 \text{ million}$$

Annual net cash flow = Net income + noncash expenses

$$= 0.65(\$5 \text{ million}) + 2.5 \text{ million}$$

$$= \$5.75 \text{ million}$$

Total cash flow year 6 = net flow + recovery of NWC

$$= \$5.75 \text{ million} + 3.2 \text{ million}$$

$$= \$8.95 \text{ million}$$

Cash flows for the project:

Year	Cash Flow
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<i>0</i>	<i>\$(19.2 million)</i>
<i>1-5</i>	<i>5.75 million</i>
<i>6</i>	<i>8.95 million</i>

$$NPV = \$4.3 \text{ million} > 0$$

Accept the project.