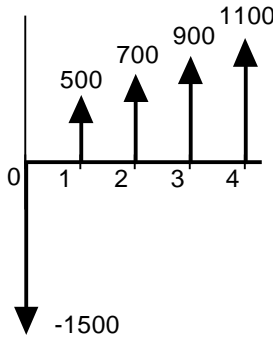


Inflation Homework

1. Life = 4 years



You are to analyze the cash flow on the left with several assumptions regarding inflation. In all cases the general inflation rate is 10%. The MARR without considering inflation is 15%. Be sure to specify the interest rates in the formulas. The goal is to use as few terms as possible in the formula. Determine if this is an acceptable investment in each case.

- a. The cash flow is expressed in today's prices. The elements in the cash flow inflate at a 10% rate.
 - b. The cash flow is expressed in today's prices. The elements in the cash flow inflate at a 5% rate.
 - c. The cash flow is expressed in today's prices. The elements in the cash flow inflate at a 0% rate.
2. A company has two mutually exclusive investment alternatives to perform some function. The data concerning the alternatives is estimated in today's prices. The general inflation rate is 8%. You are to do a before tax rate of return analysis to select the best one. The company requires a before tax rate of return of 25% on its investments. This rate includes an allowance for inflation.

Alternative	A	B
Initial Investment	\$10,000	13,000
Annual Profit	8,000	9,000
Salvage	3,000	2,000
Life	5 years	5 years

- a. The annual profits and salvage values are expected to rise at the same rate as general inflation.
 - b. The annual profits are expected to rise at 1/2 the rate of general inflation. The salvage values are expected to rise at double the rate of general inflation.
3. Motorola is considering the purchase of a machine costing \$15,000 for its manufacturing plant at Austin. The machine has a useful life of 5 years. The revenue generated by the machine and maintenance costs for the 5 years are as given below.

	years 1-3	years 4-5
Revenue	\$7,000	\$5,000
Maintenance costs	\$1,000	\$3,000

The company uses the MACRS method for depreciation. The IRS specifies the three-year

class for this type of machine. Depreciation percentages for this class are listed below. The actual salvage for the machine will be \$1000 at the end of 5 years.

The tax rate is 50% for net incomes (including the capital gain or loss on the salvage value).

MACRS Percentages

Year	1	2	3	4
Percentage	33.33	44.45	14.81	7.41

- a. Assume no inflation. If the MARR after taxes is 10%, is this an acceptable investment?
 - b. Assume a general inflation rate of 5%. Both the BTCF and the Salvage value are expected to inflate at the same rate as general inflation. The after tax MARR without considering inflation is 10%. Do an after tax analysis considering the effects of inflation. Is this an acceptable investment? Comment on the effect of inflation on the after tax earnings.
- 4.
- a. Five years ago you purchased some stock for \$10,000. Today you sold the stock for \$20,000. The tax on capital gains is 30%. During the five-year interval the annual inflation rate was 5%. What after tax rate of return, corrected for inflation, did you earn on this investment?
 - b. During 1980 a school district spent \$1,000,000 to operate its schools. Ten years later, in 1990, the school district spent \$2,000,000. During this time, the inflation rate was 10% per year. In *real* terms, by how much has the cost of operating the school increased over the ten-year period?
 - c. When you own a bond you will receive a series of fixed payments in the future. If the rate of inflation increases, how will this affect the price you should be willing to pay for the bond and why?
 - d. A company invests in a fixed asset and is required to depreciate it using one of the methods. In a period with high inflation, why is it particularly important to use an accelerated depreciation method?
 - e. Using estimates of future costs and benefits based constant dollars you compute the net present value for a project. For this computation you use a real dollar minimum acceptable rate of return equal to 5%. The NPV turns out to be -\$100 and the project is rejected. Someone points out that your analysis underestimates future cash flows. They should increase with general inflation in future years. The inflation rate is expected to be 10% per year. How should you change your analysis?
5. An Engineer is considering a project requiring an investment of \$65,000. Initial estimates suggest end of the year revenues and costs associated with the project as given in the table below. The project lasts three years and there is no salvage value. These estimates are based on today's prices. When considering inflation, however, we expect the revenues to grow at the same rate as general inflation, 5% per year. The process uses a raw material whose price

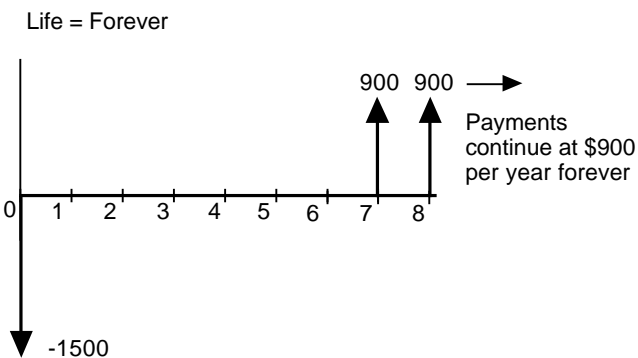
is expected to drop in the future at the rate of 5% per year. For example the actual cost of the raw material during the first year is $0.95 \times 20,000$. The rate of general inflation is estimated at 5% per year for the next three years.

Year	1	2	3
Revenue	70,000	50,000	30,000
Operating Cost	20,000	20,000	20,000

The company's MARR without adjusting for inflation is 10%. Is this an acceptable investment?

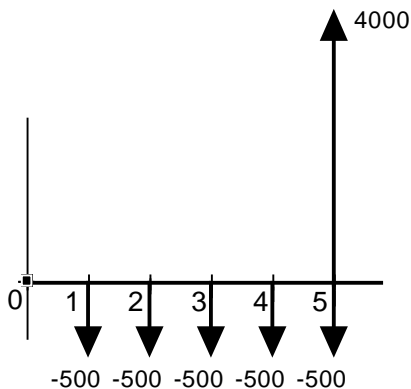
6. Given the cash flow on the left, write the formula for the quantity required on the right. In all cases the general inflation rate is 5%. The MARR without considering inflation is 10%. Use as few time-value-of-money factors in the formula as possible. Use numerical interest rates in the formula.

- a. The cash flow is in actual dollars.



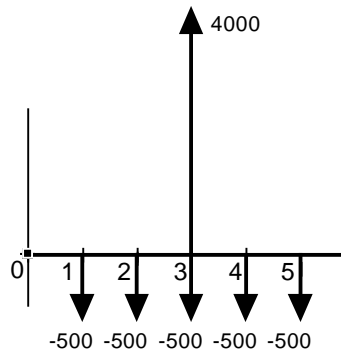
Write the formula for the NPW.

- b. The cash flow is in real dollars.



Write the formula for the NAW expressed in actual dollars.

c. The cash flow is in actual dollars.



Write the formula for the equivalent amount at time 3 expressed in real dollars.

7. A company has a business opportunity that will last three years. To enter the business the company must invest in assets that cost \$4,000 at time zero. The assets are depreciated using the double rate declining balance method with a tax life of five years.

The annual net revenue to be gained from the opportunity is \$1,500.

At the end of the three years, the assets will have a salvage value of \$3,000.

The after tax MARR for the company is 20%. Assume a tax rate of 40%.

Show the after tax cash flows for the project. Work in whole dollars.

a. Show the ATCF without inflation.

b. Show how inflation would affect the ATCF. Assume a general inflation rate of 8%. The company's MARR without considering inflation is 20%. The annual net revenue is fixed by contract and it does not change with inflation. The salvage value is fully responsive to inflation. In addition to the ATCF, show the interest rate that would be used for the analysis.