Inflation Homework

1. An investor requires a MARR of 12% before inflation (not considering the effect of inflation on future costs and benefits). If an inflation rate of 8% is expected, what MARR of return should the investor require for an analysis that includes the effect of inflation?

If the labor cost is $15 an hour today and the inflation rate is 6%, how much would you expect the labor cost to be in three years?

2. Milissa is considering buying the piece of land adjacent to her day care center to use as a play area. Maintenance costs (mowing the lawn, etc.) are expected to be $500 a year for every year of the project. She expects that the additional lure of the play area will bring in extra business, increasing her income by $1000 in year one, and increasing by $600/yr. thereafter ($1600 in year 2, etc.). She plans to keep the land for five years, then donate it to the town (meaning no salvage value). All these costs and revenues are estimated in today's dollars. The cash flows expected to inflate by 7% per year. This is the same as the general rate of inflation.

How much should she pay for the land in order to get a 12% rate of return? This minimum rate of return rate includes the effect of the 7% inflation rate.

3. An investment of $2000 results in the cash flow below. The amounts are expressed in constant dollars.

   ![Cash Flow Diagram](image)

   a. The general rate of inflation is 6% and future cash flows are expected to increase with inflation. In the table below, show the amounts in actual dollars.
b. Your minimum acceptable rate of return without considering inflation is 10%.
Should you accept this investment opportunity? Show your work.

4. For the cash flow in the figure of problem 3, say you must pay taxes on the incomes shown. The investment for the project is to be depreciated with the sum-of-the-years digits method. The future incomes are expected to increase with an inflation rate of 6%. The general rate of inflation is also 6%. The tax rate is 40%, the tax life is 5 years, and salvage is zero.

Show in the table below the after tax cash flows for the 5 years associated with this project. Also show the interest rate you should use that is appropriate for these cash flows. The after tax MARR without considering inflation is 10%.

<table>
<thead>
<tr>
<th>Time</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>CF</td>
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<td>ATCF</td>
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Should you accept or reject this project?

5. Your brother needs a $5,000 loan to go to college. Because of his poverty, he will pay nothing for the next four years. Five years from today he will begin paying you $2500 a year for the next 4 years. The first payment occurs 5 years from today and the total of the four payments will be $10,000.

a. If your minimum rate of return is 8%, is this an acceptable investment?

b. For the same payment schedule but with a 5% rate of inflation, is this an acceptable investment? Note that your brother pays you $2500 a year regardless of the inflation rate. Provide quantitative justification for your decision.
6. In each case I want you to write the formula that you would use to evaluate the investment described by the cash flow on the left. In all cases the inflation rate is 5%. Use as few time value of money factors in the formula as possible. Use numerical interest rates in the formula.

a. Life = 4 years

Write the formula for the NAW expressed in constant dollars
The cash flow is in constant dollars.
The MARR including the effects of inflation is 20%.

b. Life = 8 years

Write the formula for the NAW expressed in constant dollars
The cash flow is in actual dollars.
The MARR including the effects of inflation is 20%.

c. Life = 4 years

Write the formula for the after tax NPW
The cash flow is in actual dollars.
Use Straight line depreciation.
The tax rate is 40%. The tax and actual salvage are zero.
The after tax MARR not including the effects of inflation is 10%.
7. You are to do an analysis of an investment with and without taxes and with and without considering inflation. The initial investment (at time 0) is $10,000. The projected benefits of the investment are $1,000 per year. After 5 years the project will be sold for $8,000. All these amounts are estimated in real (year-0) dollars. The MARR for the project is 20%, and does not include an allowance for inflation. This MARR is to be used for both the before-tax and after-tax analyses. In each case you are to write the formula for the net present value of the investment. Be sure to show the appropriate interest rate. It is not necessary to evaluate the formula.

a. Consider the investment without taxes and without inflation. Write the formula for the net present value of the investment.

**Formula**

b. Consider the investment with taxes but without inflation. Write the formula for the net present value of the investment. Use straight line depreciation with a salvage of 0. The tax rate is 40% for all kinds of taxes.

**Formula**

c. Consider the investment without taxes but with inflation. The original information given about the problem was in real dollars. The inflation rate is 10% per year for the benefits. The salvage value is also expected to be affected by inflation, growing at a rate of 10% per year. The general inflation rate is also 10% per year.

**Formula**

d. Consider both taxes and inflation in this part. The general inflation rate is 10% per year, affecting both the annual benefits and the salvage value. Use straight-line depreciation with a salvage of 0. Assume that all income and capital gains are taxed at 40%. Find the NPV of the investment.