Exercise AP-131

Present value of an infinite stream starting in year 0

The Economic Skills Project

1 Problem

Problem

A project is expected to produce $30,000 a year starting immediately (in year 0) and going on forever. What is the present value of the project at an interest rate of 4% per year?

2 Answer

Answer

- $780,000

3 Method

Solution method

Here's one approach:

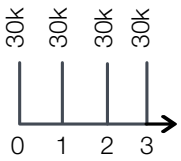
1. Draw the cash flow diagram for the project.
2. Split the cash flow into one flow at 0 and all others in a second flow.
3. Apply the appropriate PV formulas to each part.
4. Sum the two partial PVs to get the total PV.

4 Solution

4.1 Step 1

Cash flow diagram

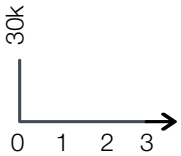
The cash flow diagram for payments from the trust fund is shown below.

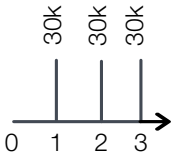


4.2 Step 2

Split the cash flow into two parts

Split off the flow at 0:





4.3 Step 2

Apply the appropriate PV formulas

The present value of the flow at 0 is F. The present value of the payments from 1 on is given by:

$$PV = \frac{F}{r}$$

Thus, the total will be:

$$PV = F + \frac{F}{r}$$

Applying that gives:

$$PV = \$30,000 + \frac{\$30,000}{0.04}$$

Done!