**Decision Making in Finance: Present Value of an Investment**

VI.B Student Activity Sheet 5: A Cool Tool!

Vanessa is a financial planner specializing in retirement savings. She realizes the importance of using mathematical formulas and the appropriate tools to help her clients understand the reasoning behind the advice she is giving.

One of her favorite tools is a time-value-of-money (TVM) calculator. In Student Activity Sheet 4, you met Josephine, one of Vanessa’s clients who wanted to retire with $1 million in savings.

**1.** In Josephine’s initial situation, she plans to retire in 50 years with $1 million in savings. Vanessa advised her to find an account that earned at least the current rate of inflation. Use this information to complete the table below.

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition of Variable** | **Value** |
| FV | future value, or value of the investment at maturity |  |
| t | number of years of investment until maturity |  |
| i | annual interest rate (as a decimal) |  |
| PV | principal, or present value |  |
| n | number of compounding periods per year |  |

Vanessa uses a TVM calculator to help Josephine understand how the different variables affect one another.

**2.** Identify the values in Josephine’s situation for each variable that the TVM calculator uses.

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition of Variable** | **Value** |
| **N** | number of compounding periods between the time of investment and the time of retirement |  |
| **I%** | annual interest rate (as a percent) |  |
| **PV** | principal, or present value |  |
| **PMT** | amount of each regular payment |  |
| **FV** | future value, or value of the investment at maturity |  |
| **P/Y** | number of payments per year (usually the same as the number of compounding periods per year, ***C/Y***) |  |
| **C/Y** | number of compounding periods per year |  |

**3.** Use the TVM calculator to determine the present value (***PV***) of the investment required to meet Josephine’s retirement goal. How does this amount compare to what you determined in Student Activity Sheet 4?

Use the TVM calculator to answer the following questions for some of Vanessa’s other clients.

**4.** Reginald wants to find the future value of an investment of $6,000 that earns 6.25% compounded quarterly for 35 years.

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition of Variable** | **Value** |
| **N** | number of compounding periods between the time of investment and the time of retirement |  |
| **I%** | annual interest rate (as a percent) |  |
| **PV** | principal, or present value |  |
| **PMT** | amount of each regular payment |  |
| **FV** | future value, or value of the investment at maturity |  |
| **P/Y** | number of payments per year (usually the same as the number of compounding periods per year, ***C/Y***) |  |
| **C/Y** | number of compounding periods per year |  |

**5.** Hilda wants to have $10,000 in 10 years after investing in an account that earns 3.6% compounded monthly.

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition of Variable** | **Value** |
| **N** | number of compounding periods between the time of investment and the time of retirement |  |
| **I%** | annual interest rate (as a percent) |  |
| **PV** | principal, or present value |  |
| **PMT** | amount of each regular payment |  |
| **FV** | future value, or value of the investment at maturity |  |
| **P/Y** | number of payments per year (usually the same as the number of compounding periods per year, ***C/Y***) |  |
| **C/Y** | number of compounding periods per year |  |

**6.** Juan wants to invest $1,250 in an account that earns 2.34% interest, compounded monthly. How many years will it take for the account to have a value of $5,000?

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition of Variable** | **Value** |
| **N** | number of compounding periods between the time of investment and the time of retirement |  |
| **I%** | annual interest rate (as a percent) |  |
| **PV** | principal, or present value |  |
| **PMT** | amount of each regular payment |  |
| **FV** | future value, or value of the investment at maturity |  |
| **P/Y** | number of payments per year (usually the same as the number of compounding periods per year, ***C/Y***) |  |
| **C/Y** | number of compounding periods per year |  |

**7.** Another of Vanessa’s clients, Ronnie, wants to save for retirement. Ronnie believes that he will need $2,000,000, since he is planning to be retired for 20 to 30 years. He can save in investments that have the following parameters:

The number of years to save is 20 to 40.

The number of compounding periods is annually, quarterly, monthly, weekly,

and daily.

The interest rate can be 2.77% to 5.23% or any rate between.

Ronnie wants to know the effect that each variable has on the present value. Select a variable, and use the following steps to complete the table below:

Start with the minimum value of your variable.

Use the average value of the other variables that have parameters.

Calculate the present value of the investment.

Decide the next value of your variable to test and repeat the process for a total of five different values.

**Present-Value Analysis for Years**

|  |  |  |
| --- | --- | --- |
| Variable Value:Minimum:Maximum: | **Present Value (PV)** | **Percent Change in Present Value** |

**Present Value Analysis for Interest Rate**

|  |  |  |
| --- | --- | --- |
| Variable Value:Minimum:Maximum: | **Present Value (PV)** | **Percent Change in Present Value** |

**Present Value Analysis for Compounding Periods**

|  |  |  |
| --- | --- | --- |
| Variable Value:Minimum:Maximum: | **Present Value (PV)** | **Percent Change in Present Value** |

**8.** Overall, what impact on the present value does each variable have?

**9**. **REFLECTION:** Of all the variables, which seems to have the greatest effect on lowering the present value of Ronnie’s investment? Explain your reasoning.