Assignments

Financial Plan Assignments

As you read through this chapter, think about the purpose of each new financial idea: annuities, present value of an annuity, and future value of an annuity. Also review the uses of amortized loans and the calculations that concern them. Using either your financial calculator or the Excel financial calculator from the Learning Tools section, make sure you understand how to solve problems of amortized loans and annuities, including the present and the future value of an annuity. It is also critical that you understand the impact of inflation on returns. Make sure you understand the correct method for calculating real returns (the return after the impact of inflation).

Learning Tools

The following Learning Tools may also be helpful as you prepare your Personal Financial Plan:

3. Financial Calculator Tutorial

This document is a tutorial for how to use most of the major financial calculators. It also includes the financial formulas for those who prefer to program their own calculators.

12. Excel Financial Calculator

This Excel spreadsheet is a simple financial calculator for those who prefer to use spreadsheets rather than financial calculators. It can perform most of the functions of a financial calculator, including the functions of present value, future value, payments, interest rates, and number of periods.

Review Materials

Review Questions

1. What is an annuity?
2. How do you set up an annuity?
3. What is a compound annuity?
4. What is the relationship between interest rate and present value?
5. What is inflation? How does it impact investments?

Case Studies

Case Study 1

Data

Lee is 35 years old and makes a $4,000 payment *every year* into a Roth Individual Retirement Account (IRA) (this is an annuity) for 30 years.

Calculations

Assuming the discount, or interest, rate Lee will earn is 6 percent, what will be the value of his Roth IRA investment when he retires in 30 years (this is future value)?
Note: The formula is a bit tricky. It is

FV_N = Payment * $[(1 + I)^N - 1] / I$ (This is the future value of an annuity factor $_{N,I}$)

Case Study 1 Answer

There are two ways for Lee to solve the problem. Using the formula, the problem is solved this way:

$FV_{N,I}$ = Payment * $[(1 + I)^N - 1] / I$ = FV = $4,000 * $[(1.06)^{30} - 1] / .06$ = $316,232.75

If you are using a financial calculator, clear the calculator's memory and solve:

1 = P/Y (payments per year)
4,000 = PMT (payment)
6 = I (interest rate)
30 = N (number of years)
Solve for FV = $316,232.75

<u>Case Study 2</u>

Data

Janice will make a *yearly* $2,000 payment for 40 years into a traditional IRA account.

Calculations

Given that the discount, or interest, rate is 6 percent, what is the current value of Janice's investment in today's dollars? The formula is

$PV_{N,I}$ = Payment * $[1 - (1 / (1 + I)^N)] / I$ (the present value of an annuity factor $_{N,I}$)

Case Study 2 Answer

Using the formula, the calculation is
$PV_{N,I}$ = Payment * $[1 - (1 / (1 + I)^N)] / I$ = PV = 2,000 * $[1 - (1 / (1.06)^{40})] / .06$ = $30,092.59
Using the financial calculator, the calculation is

Clear memories and use the following:
1 = P/Y
2,000 = PMT
6 = I
40 = N
Solve for PV = $30,092.59

Case Study 3

Data

Brady wants to borrow $20,000 dollars for a new car at 13 percent interest.

Calculations

He wants to repay the loan in five *annual* payments . How much will he have to pay *each year* (this indicates present value)? The formula is the same formula that was used in the previous problem:

PV_N = Payment * ($PVIFA_{I,N}$)

Case Study 3 Answer

Using the formula, put Brady's borrowed amount into the equation and solve for your payment. $PV_{N,I}$ = Payment * [1 – (1 / (1 + I)^N)] / I = PV = 20,000 = Payment * [1 – (1 / (1.13)^5)] / .13 = $5,686.29 per year.

Using a financial calculator, clear the calculator's memory and use the following:

1 = P/Y
20000 = PV
13 = I
5 = N
Solve for PMT = $5,686.29

Case Study 4

Data

Kaili has reviewed the impact of inflation in the late 1970s. She reviewed one of her parent's investments during that time period and discovered that inflation was 20 percent and that her parent's investment made a 30 percent return.

Calculations

What was her parent's real return on this investment during that period?

Case Study 4 Answers

The traditional (and incorrect) method for calculating real returns is

Nominal return – inflation = real return. This formula would give you a real return of 10%: 30% – 20% = 10%.

The correct method is (1 + nominal return) / (1 + inflation) – 1 = real return

(1.30 / 1.20) – 1 = 8.33%.

In this example, the traditional method overstates return by 20 percent ((10% / 8.33%) – 1). Be very careful of inflation, especially high inflation!