Chapter 21: Saving Models

For All Practical Purposes

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Section 21.4 A Model for Saving

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A Savings Plan

- To have a specified amount of money in an account at a particular time in the future, you need to determine what size deposit you need to make regularly into an account with a fixed rate of interest.

- Savings Formula

  The amount A accumulated after a certain period of time can be calculated by stating a uniform deposit of d per compounding period *(deposited at the end of the period)* and using a certain interest rate i per compounding period.

Savings Formula

$$A = d\left[\frac{(1+i)^n - 1}{i}\right]$$

Where:

- A = Amount accumulated in the future after compounding interest is earned
- d = Uniform deposits (or payments made)
- i = Interest rate per compounding period which is computed as $i = r/m$
- n = Number of compounding, n=mt
- t = The years of the savings plan (or loan)

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Example: An individual saves $100 per month, deposited directly into her credit union account on payday, the last day of the month. The account earns 6% per year, compounded monthly. How much will she have at the end of 5 years, assuming that the credit union continuous to pay the same interest rate?

Solution: In this case d=$100, the monthly interest rate is 0.06/12.

Answer:

$$A = \$100\left[\frac{(1+\frac{0.06}{12})^{60}-1}{\frac{0.06}{12}}\right] = \$6977.00$$

- Payment Formula: $d = A\left[\frac{i}{(1+i)^n - 1}\right]$
  - Solving for d in the Savings Formula so we can calculate how much our periodic payment should be in order to have $A in the future yields:

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Old Exam Question

The Chavez family has decided to save up for a new spa. They want To save $10,000 in five years. They find a savings account for which Interest was compounded monthly at 8.2%. How much will they have To deposit each month to meet this goal?

$i = r/m = 8.2\%/12 = 0.082/12 = 0.00683$

$n = mt = 12x5 = 60$

$d = A\,[i/(\,(1+i)^{n}-1)] = \$10{,}000 \times 0.013539 = \$135.39$