

Lecture 10/02/23 + 10/04/23
Hw Due 21 22 23 24
 M W Fri Sun

Quiz 5 On Friday

CRA Due Friday (If you have not done it, please do so now).

Defn/Formula: The amount, $A(t)$, accumulated in an account bearing interest compounded annually (once per year) is

~~P(t) = P(1+r)^t~~
 $A(t) = P(1+r)^t$

P = Principal (initial) amount invested

r = effective annual interest rate

t = time in years

$(r = b - 1)$ $b = 1 + r$: growth factor

~~recognition factor~~

Compounding per year means we apply interest once per year.

~~effective annual interest~~

~~the~~ ~~the~~

W: #6 a, b

A: \$4,000

$$A: b = 1 + r = 1.047 \Rightarrow r = 4.7\%$$

Compounding n -times per year (applying interest n -times per year).

$$A(t) = P \left(1 + \frac{r}{n} \right)^{nt}$$

~~def~~ P = Principal (initial) amount
 r = nominal interest rate
 n = number of times the interest is compounded
 t = time in years.

~~Warning: If $n = 1$ nominal interest = effective annual interest. If $n \neq$~~

~~nominal interest \neq effective annual interest~~

Warning

$$1 + \frac{r}{n} \neq \text{growth factor} = b$$

ab^t so no n by the t

$$\left(1 + \frac{r}{n} \right)^n = b \text{ (growth factor)}$$

Needs to be in sum

Given a nominal interest rate r and compounding n -times per year

$$A(t) = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\boxed{\text{effective annual interest rate} = \frac{1 - \left(1 + \frac{r}{n} \right)^{-n}}{1 - b}}$$

Caution: nominal interest rate = effective annual interest rate if and only if $n=1$:

Compound 1-time per year $n=1$ so

$$\boxed{\begin{aligned} \text{e.a.i.r} &= 1 - \left(1 + r \right)^{-1} \\ &= r \end{aligned}}$$

Problem 3

Hi. Nominal = 0.13 = r

$$a) 1 - \left(1 + r \right)^{-1} = 1 - \left(1 + 0.13 \right)^{-1} = 0.13$$

$$b) 1 - \left(1 + \frac{r}{12} \right)^{-12} = 1 - \left(1 + \frac{0.13}{12} \right)^{-12}$$

$$c) 1 - \left(1 + \frac{0.13}{52} \right)^{-52}$$

$$d) 1 - \left(1 + \frac{0.13}{365} \right)^{-365}$$

$$e) 1 - \left(1 + \frac{0.13}{24 \cdot 365} \right)^{-24 \cdot 365}$$

Work on: $\$1, 2, 4, 5, 7$
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5min 15min

will continue tomorrow!